A CHILTON PUBLICATION NATIONAL METALWORKING March 11, 1954

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the Cold Metal Products co.

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15601 Lathrop Avenue, Harvey, Illinois
Sales Offices and Distributors in all Principal Cities.



Whiting Corporation also manufactures Railroad and Aviation Equipment, Swenson Chemical Processing Equipment and Metal-working Machinery. Whiting Trambeam Crane quickly and efficiently stacks steel rods in warehouse of Crucible Steel Co. of America Indianapolis.

# BETTER PRODUCT DESIGN WITH STEEL WIRE



Iteel wire can often solve a tricky problem in product design. Besides its eye appeal and great strength, steel wire often makes possible real savings, too. It's readily available and easy to fabricate.

In our modern wire mills we're turning out all kinds of steel wire - for cold-headed items, welded products, springs, gadgets, hardware, fasteners. Some are ordinary grades of wire; others are "specials."

Perhaps you have a design problem to which steel wire would furnish the solution. Let us help you select the grade that combines the strength, ductility and finish that the job requires. Phone or write the nearest Bethlehem sales office for complete information.



LIGHT GUARDS – The improved welded-wire design, at right, uses two concentric rings as a base, spaced to accommodate mounting bolts. Made from economical steel wire, the guard is stronger and less costly than the casting at left.



MOTOR MOUNT – Using spot-welded wire, the redesigned unit at right weighs only 12 per cent as much as the previous design at left. The use of steel wire greatly reduces and appearance is improved.

Photographs reproduced through the courtesy of E. H. Titchener & Co., Binghamton, N. Y., long a user of Bethlehem Wire. This firm specializes in the imaginative use of wire to simplify product designs and reduce production costs.

#### BETHLEHEM STEEL COMPANY BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation



great variety of finishes.

# the Iron Age

Vol. 173, No. 10, March 11, 1954

\*Starred items are digested at the right.

#### EDITORIAL The Numbers Game ..... NEWS OF INDUSTRY \*Special Report: Steelmen See Upturn..... \*Research: Zone Melting Purifies Germanium... 78 \*Venture Pushes Vacuum Melting . . . "Hot" Tracers Check Fines Use . . . 79 \*Transportation: Rails Try Steel Recoup 81 \*Labor: What Foundries Do for Workers 83 \*Raw Materials: Start on Manganese Lode 87 Production: Machine Tools Set for Pickup Personnel: Iron Age Salutes ..... Iron Age Introduces Clearing House ..... 198 NEWS ANALYSIS Newsfront \*Automotive Assembly Line ... \*This Week in Washington West Coast Report \*Machine Tool High Spots . \*Report to Management ..... TECHNICAL ARTICLES \*Zinc Plate Meets Specs on Cartridge Cases ... \*Deburring: Modern Methods, Tools Cut Costs. \*Automated Units Speed Turning, Gaging ... 144 \*Low-Cost Alloys Offer Good Heat Resistance 146 \*How to Press Form Titanium Parts 149 Technical Briefs 154 MARKETS & PRICES \*The Iron Age Summary—Steel Outlook Market Briefs \*Nonferrous Markets Iron and Steel Scrap Markets Comparison of Prices Steel Prices REGULAR DEPARTMENTS Dear Editor Fatigue Cracks Dates to Remember 13 Free Publications 107 New Equipment . INDEX OF ADVERTISERS

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# DIGEST of t

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#### **NEWS DEVELOPMENTS**

STEELMAKERS STILL SEE BUSINESS UPTURN — P. 75
News that the ingot rate dipped to 70.5 pct last week
caused a lot of economic eyebrow lifting. So IRON AGE
launched an extensive check on steel market conditions.
Result was a solid vote of confidence that the steel
market is not going to fall on its face—an upturn is in
the cards.

ZONE MELTING PURIFIES GERMANIUM METAL — P. 71 Impurities in germanium are cut to 1 part in 10 billion by a new technique known as zone melting. Developed by Bell Laboratories to produce pure germanium needed in transistors, the process consists of moving a narrow molten zone through the length of an ingot. Impurities collect at the end, may be cropped off.

JOINT VENTURE PUSHES VACUUM MELTING — P. 79 Commercial production of vacuum-melted steels and other alloys will be greatly expanded under joint venture between Crucible Steel Co. and National Research Corp. Crucible has acquired 50 pct of Vacuum Metals Corp. An early step will be installation of a \$250,000 furnace for 500 pct expansion.

WHAT AVERAGE FOUNDRIES DO FOR WORKERS—P. 83 A new survey shows that the average medium-sized foundry doesn't have pension, profit sharing plans or escalator clauses. But foundry management is thinking about adding these benefits. National Foundry Assn. finds that time-and-a-half pay is common, six paid holidays are usual.

START WORK ON BRAZILIAN MANGANESE LODE—P. II Construction has finally begun on railroad and port facilities in the jungles of Brazil's Amapa Territory. Work is part of manganese ore project. Deposit is jointly owned by a Brazilian firm (51 pct) and Bethlehem Steel Corp. (49 pct). First shipment is expected early in 1957.

CONGRESS TO GIVE TAX BREAKS TO CONSUMER—9. 97
This year's tax legislation is now clearly destined to
give the biggest break to the consumer. Idea is to put
more money into the buying public's pocket. Personal
exemptions may be boosted \$200 per person. Excise
taxes are slated for a \$1-billion clipping. But corporate
rate cut isn't likely.

# of the Week in Metalworking

#### ENGINEERING & PRODUCTION

ZINC PLATING SAVES CARTRIDGE BRASS — P. 135
Zinc coating on large steel cartridge cases at the
Riverbank Ordnance Plant is applied in a fully automatic plating setup to meet rigid specifications. Individual chemical processes are not complex or unique.
Maintenance of equipment is a must since breakdown
of one component may mean failure of the entire line.

- P. 75

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DEBURRING: MODERN METHODS CUT COSTS — P. 140 Take another look at burring, chamfering and edgebreaking operations. They may offer plenty of room for savings in production costs through use of improved methods, equipment and tools. New cutting tools speed chamfering; wider use of abrasives can speed deburring; power driven tools boost operator output.

AUTOMATED UNITS SPEED TURNING, GAGING — P. 144
Automotive camshafts are automatically processed
through two turning and gaging operations. New-type
transfer units are easy to maintain, eliminate manual
handling. Trolley-type work loaders and unloaders,
multiple carbide tooling, built-in electric gages are
features. Parts are banked ahead of each lathe.

LOW-COST ALLOYS FOR HEAT RESISTANCE — P. 146
Five relatively low-cost alloys can replace some of
the more expensive, harder-to-get heat-resistant alloys. Knowledge of their properties can save time and
money in meeting many specific service requirements.
Alloy 309 gives excellent service at elevated temperatures; alloys 430 and 446 resist excessive scaling.

HOW TO PRESS FORM YOUR TITANIUM PARTS — P. 149 Rubber pad, brake, stretch and drop hammer forming produce 135 titanium production parts at North American Aviation. Preparation of work is critical phase. Edges of blanks must be deburred, preferably polished to prevent notch sensitivity failures. Shrink forming takes special methods to reduce wrinkling.

NEXT WEEK—DUCTILE IRON GOOD FOR TOUGH JOBS Ductile iron's toughness, impact resistance, machinability and good wear qualities have made it a preferred material for many of industry's toughest applications, Close control is a must in all foundry operations. Excellent castability of ductile iron simplifies pouring to difficult contours in die work.

#### MARKETS & PRICES

RAILS MOVE TO RECOUP STEEL FREIGHT — P. 81 Coming up: Another round between eastern railroads and truckers over the iron and steel shipping dollar. Stakes are high and both sides are playing for keeps. Trend has been against the railroads but now they're asking rate cuts on 40,000 and 80,000-lb quantities. You can count on truckers to retaliate.

BIG THREE SPEND FOR AUTO SALES RACE — P. 92 Two of the three big automakers have had to borrow extensively in order to maintain the expensive development programs made necessary by the stepped-up pace of competition. Chrysler's purchase of the \$62 million Briggs Body Co. packages a move to cut costs and improve productive efficiency as net earnings drop.

PUSH FIGHT ON NON-DEFENSE LEASING — P. 103
The government not only owns a lot of butter and wheat, it also has a lot of modern, slightly used machine tools. Estimates are the U. S. owns one out of every five machine tools. And now that defense production is no longer pressing, they're going into a reserve. Builders hit nondefense leasing.

WHAT'S HAPPENING ON THE TAX FRONT? — P. 105 In the give and take on tax policies, Treasury is ending up the loser. House Ways & Means Committee last week followed Administration prodding by recommending: cancellation of the scheduled corporate tax cuts, continuance of excises on autos, liquor, tobacco. But other excise cuts will cost \$1 billion.

CUSTOMER NOW KING OF THE STEEL MARKET — P. 177
Steel customers today are demanding and getting
quality, service, freight absorption, and quick delivery.
Mills are using stocks of semi-finished steel to make
good on quick delivery promises. Decline in ingot rate
attributed to big stocks of ingots and semi-finished
at mills estimated well above 2 million tons excess.

U. S. WCN'T SIGN INTERNATIONAL TIN PACT — P. 180 State Dept. has announced that the U. S. won't sign the Geneva-written tin agreement. A U. S. "aye" is not needed for acceptance of the agreement, and State Dept. said abstention was not intended to prevent the plan from going into effect. At the same time it was stated U. S. won't dump 40,000-ton surplus.

March 11, 1954

Increase Your Profits—
get the highest possible recovery of aluminum scrap with
the help of

Induction Gurnaces—



AJAX induction furnaces are used in many plants for the efficient recovery of loose scrap, such as foil, chips, borings, turnings and the like. They are also adaptable for the full range of non-ferrous metals and alloys with the same advantages obtained in aluminum, and are built in sizes ranging from 20 kw to 1400 kw.

AJAX low frequency induction furnaces will melt aluminum foil scrap with the lowest obtainable melting losses. Photo above shows an AJAX 166 kw melting furnace installed at the plant of the TOYO Aluminum Works in Yao, near Osaka, Japan. Unbaled foil scrap shown at right edge of photo is remelted at the rate of about 900 pounds per hour with a recovery of over 99%. Molten metal is poured into ingot molds as shown in the front of the photo. Another view of same furnace is shown in small photo at right.



Send for Reprint of Article on Scrap Recovery by Induction Furnaces

AJAX TAMA-WYATT=



ENGINEERING CORP., TRENTON 7, N. J. INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies AJAX ELECTROTHERMIC CORP., as Northing high frequency induction furnace. AJAX ELECTRIC CO., INC., The Asia thingres factor Sait Bash furnace AJAX ELECTRIC FURNACE CORP., and Wysil induction furnaces for Method

# **Fatigue Cracks**

by William M. Coffey

#### New Club

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Whenever we have nothing else to write about we start a new club. Hope it lasts longer than the rest. It's to be called the Worry Club.

For years, since time, all kinds of learned people—Sicologists, Sikiatrics, Fiziologists and others of the same stamp, male and female—have been advocating a false philosophy. They've been telling people it doesn't do any good to worry.

We hold that nothing is accomplished unless it is worried about first. And the bigger the worry, the bigger the accomplishment. Where would the world be today if people didn't worry about it? Where would you be today if you didn't worry? Not going to worry about citing any specific examples now.

#### **Misery Breeds**

Our troubled Metallurgical Editor, Bill Latiano—he with all the misery about turnpikes running through his houses—has found a friend. He is George Long, Advertising Manager of the Sales Corporation of America, who sympathizes with Bill as follows:

Dear Mr. Latiano:

About a week ago I read (THE IRON AGE, 2/4/54) of the trouble you were having because highway departments in two states seemed bent on routing 10-ton trucks through your living room.

My reason for writing is merely to tell you that I have the same problem . . .

Normally, I would have this letter typed on company stationery, but I'm writing this at home for an excellent reason. I was putting some finishing touches on a garage which I had been enlarging since last summer, and on New Year's Day I fell from a ladder. The intervening time has been spent at a hospital or at home recovering from the broken leg sustained in the fall.

The first working day (Jan. 4) after the fall occurred the surveyors were around, and notified us that a new turnpike would wipe out our house and, of course, the still somewhat unfinished garage.

What trick of fate would you suppose had held up the surveyors by one working day, and

prevented them from reaching our house on December 31? Needless to say, had they arrived on that date, my work on the garage would have been stopped immediately and, it seems logical to assume, the broken leg would have been avoided.

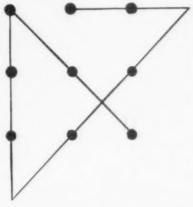
Better luck to you in your new home, wherever it is going to be.

Very truly yours, GEORGE T. LONG,

An even better club would probably be one open for all people affected by the perversity of inanimate turnpikes.

#### **Puzzlers**

Here's how you draw four straight lines through those nine dots without removing the pencil from the paper or retracing a line:

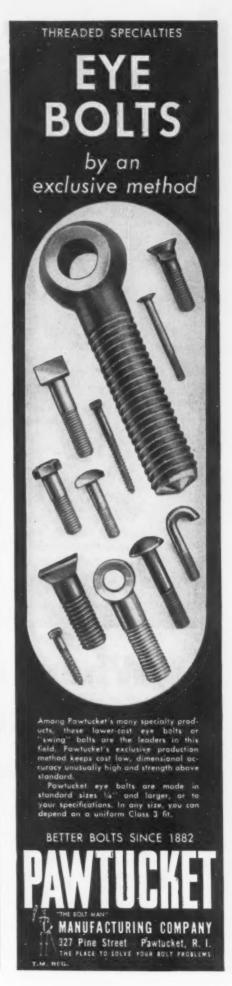


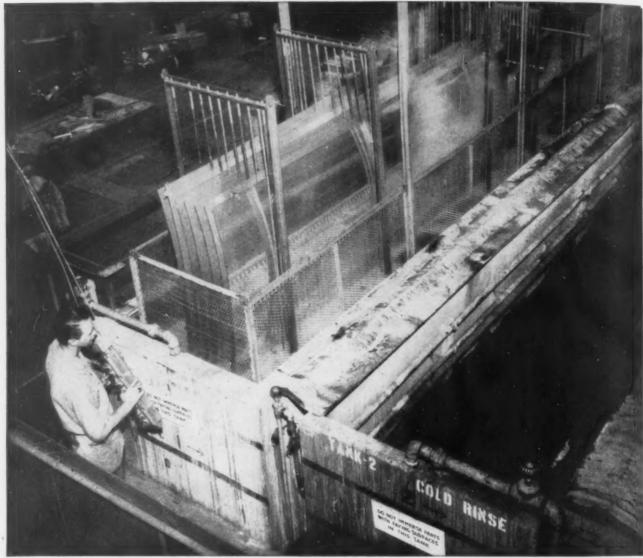
Winners: Miss Charlsie Burch and Orville Ganz, Mark Perucich, John Cluck, Ed Schwab, J. S. Prifogle, Ole Ridg, C. A. Johnson, John Herb, qqU blanoD (need a mirror for this), Humpty-Dumpty Alsterlund, David Dion, George Guzman, P. Gardiner, M. A. Erwin, Lee Garfield, Ralph Reid, Bill Kent, E. Allison, George Basco, Miss Patricia McDowell, H. Moran, John Barnes, William A. Bley, Harry G. Klempner, Murray Lester, B. G Jacobs, Victor Goodwin, Leo Elsen, Frank Dressel, Carl Fullman, Helen Guy, Irving Leon, Joseph Mandell and Mr. Rice.

#### **New Puzzler**

John Herb sends us this one.

A 15-foot circumference flywheel starts rotating at 1800 rpm. At each succeeding second the rotational speed is decreased by 5%. How far did a point on the perimeter travel when the wheel is almost at rest?





# Where airplane skeletons swim in acid

#### A typical example of B. F. Goodrich product development

 $B_{\mbox{\ airplane}}^{\mbox{\ effore}}$  the wings and body of an airplane can be covered, the frame must be cleaned of the slightest speck. Big tanks like these were used, filled with acids that are off scale and got the parts ready to be painted.

A faster process was developed but it had to use acids so strong that they would eat through wood and metal tanks. In fact, not even rubber tank linings could stand up against these acids.

An engineer thought of Koroseal, the material developed by B. F. Goodrich that stands practically all acids. It was

tried and worked perfectly-the two tanks in the picture are already lined with it. Koroseal made the new process possible, speeding up this vital step in airplane making as much as 50%.

Koroseal flexible material is but one example of the product development and improvement that is always going on at B. F. Goodrich. Every product that B. F. Goodrich makes-V belts, conveyor belts, hose and many other things-is constantly being studied by practical engineers to see how it can be improved from the user's standpoint, how it can be made to last longer and do a better job.

The tanks in the picture were lined by The Barber-Webb Company for Lockheed Aircraft Corp.

To take full advantage of B. F. Goodrich practical research, call your BFG distributor, or write to The B. F. Goodrich Company, Dept. M-205, Akron 18, Ohio.

# **B.F. Good**rich INDUSTRIAL PRODUCTS

THE IRON AGE

# THE IRON AGE Newsfront

- PURE TANTALUM MADE INTO SEAMLESS TUBING and used for steam coils in heating pickle acid tanks was recently checked after 10 years' service. Wall thickness, originally 0.013 in. is now 0.012 in. Long, uninterrupted service has repaid original cost many times.
- LOOK FOR A SMALL CAR MADE IN EUROPE and designed and marketed by a major U. S. automaker to hit salesrooms soon. In contrast to the sports car, it stresses basic transportation at low cost.
- CERMETS WITH PREFERRED DIRECTIONAL PROPERTIES have been developed. One research lab impregnates a woven metal cloth-like structure with cermets, then sinters the product. Result: Exceptionally tough preferred directional properties.
- U. S. AIRLINES MAY USE turbo-prop and turbo-jet planes in another 4 years. Economically-run turbo-prop engines probably will power cargo and air coach planes. Speedier turbo-jets would be used for first-class, long-range passenger flights.
- ONE HEADACHE FOR AUTOMOTIVE ENGINEERS is how to handle wear, scuffing and spalling associated with overhead valves in new V-8 engines. Engineers differ as to whether the answer lies in improved lubrication or in changing the metallurgy of valve lifters.
- STEEL CASTINGS FIRMS generally look for business to pick up as they move into the second quarter. Optimists think railroads will order 30,000 or more freight cars, and see auto output of 5 million cars and an estimated 1 million trucks.
- SOME STEEL PRODUCTS CAN LOOK FOR MORE COMPETITION from the fast growing plastics industry within the next few years. In addition to plastic pipe and tubing, production of polyethylene and rigid poly vinyl chloride sheets is on the rise.
- D-PROCESS SHELL MOLDING is making progress. Those using the technique for precision molding believe a 250 shell per hour rate may soon be reached. Oil is used as a binder to produce the shell molds.
- LISTING OF IRON AND STEEL SCRAP as a market commodity on the Chicago Mercantile Exchange will be considered this week. If accepted, exchange brokers would trade "futures" in scrap in a manner somewhat similar to trading of butter and egg futures.
- INERTIA AND HOPE have kept some steelmaking furnaces operating longer than economically justified in a period of decline from very high capacity operation. Steel company inventories of ingots and semi-finished steel, an estimated 2 million tons above normal at year end, have since grown much larger.
- CURRENT FALL IN INGOT RATE REFLECTS need of some steelmakers to work off stocks of semi-finished steel accumulated in hope business would improve. Rolling mills are temporarily processing more steel than is being melted. Look for ingot rate to climb as inventories are cleaned up.

March 11, 1954

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94.9% of Lockheed's 50,000
employees are enrolled
in the Payroll Savings Plan



#### ROBERT E. GROSS

President, Lockheed Aircraft Corporation National Chairman, 1953 Aircraft Industry Payroll Savings Drive

"A man's personal economic security is the sum of his own diligent effort, a financially sound government and a systematic savings plan. He has the earnings and he has the government that can protect the individual. However, human nature being what it is, not everyone maintains a systematic plan of savings. So here is a plan designed to help the employee—the Payroll Savings Plan, whereby his company will regularly invest a part of his earnings (he specifies the amount) in United States Savings Bonds, America's safest form of investment. We at Lockheed have endorsed and encouraged this plan because we know what it does to assure security—both individual and national."

Lockheed Aircraft Corporation recently conducted a personto-person canvass that put a Payroll Savings Application Blank in the hands of every employee of Lockheed's eleven plants in Southern California. At the conclusion of this oneweek campaign, 36,419 of the 38.037 employees—95.7% had signed up on the Payroll Savings Plan. Three of the eleven plants achieved 100% enrollment.

Lockheed's 95.7% in the Southern California plants is the highest employee participation of any company or group of this size this year. The previous national record in the aviation industry – 92% – was set by Lockheed's Georgia Division in April, 1953. Of Lockheed's total payroll – 50.000 men and women – 94.9% are building ". . . security – both individual and national" by systematic investment in U.S. Savings Bonds.

45,000 companies operate Payroll Savings Plans. In many of these companies employee participation ranges from 60% to 80%; in some, it is even higher. On the basis of Payroll

Savings Records, it is safe to estimate that 60% or more of the personnel of a company will join the Payroll Savings Plan-

- -if the many personal benefits of the Payroll Savings Plan are properly presented to them by management.
- if they are shown how their monthly investment in Savings Bonds contributes to national stability by adding to our reservoir of future purchasing power
   \$35.5 billion—the cash value of outstanding Series
   E Bonds—the kind purchased by Payroll Savers.

Your State Director, U.S. Treasury Department, is ready to help you build a 60%, 70% or 80% Payroll Savings Plan. He'll explain how easy it is to conduct a simple person-to-person canvass and will furnish all the printed matter, posters, etc. Phone, wire or write today to Savings Bond Division, U.S. Treasury Department, Suite 700, Washington Building, Washington, D. C.

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# Steelmakers Still See Upturn in Business

News that the ingot rate had fallen to 70.5 pct last week caused a lot of economic eyebrows to go up. That's why The Iron Age launched an exhaustive check of steel market conditions in major producing and consuming centers across the nation. The aim: To determine the outlook for steel business. Iron Age editors interviewed many key

people who make and use steel. The result is a solid vote of confidence that the steel market is not going to fall on its face, but that an upturn is still in the cards. There is terrific competition, and some firms are being squeezed. But there is no panic in steel, even though the ingot rate is only 69.0 pct this week.

Don't sell steel short.

Last week's dip in the ingot rate wasn't caused by any sudden decline in steel business. Instead it was an admission by steel companies that they had grossly underestimated the size of consumers' inventories—and consequently the time it would take to correct them.

The inventory correction cycle has been batted around until it seems trite even to mention it. Yet this is the dominant reason why producers have been putting off their recovery predictions from month to month.

#### New Orders Increase

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Producers had really counted on an upturn in March, historic month of peak steel production. And there's no denying they were bitterly disappointed when the month began with a dip instead of an upturn. But their conviction that business will improve remains unshaken.

Some very level-headed steel people are still betting on a 75 to 80 pet ingot rate for the year. If they are right, 1954 production will be between 90 and 100 million net tons. The industry has topped 100 million tons only twice in history—1951 and 1953.

Steel business today is actually no worse than 2 weeks ago when the industry was operating 4 pct higher. In some respects it is better.

For example, the number of allimportant new orders is increasing, even though individual orders are much smaller than previously, and are being placed on very short "lead" time.

#### Now On Production Cycle

Mills are getting away from the old notion about "lead" times for the various products. The term is misleading anyway. It was used as a synthetic gimmick during controls to force consumers to get their orders in within the "lead" period.

#### What's Ahead in Steel

A careful check of producers and users leads to these conclusions:

- (1) An upturn in steel business is still expected.
- (2) Drop in ingot rate was not caused by current decline in steel business; rather it is attributed to postponement of expected pickup.
- (3) Mills grossly underestimated consumer inventories of steel. Inventory correction may continue for months.
- (4) Mills themselves have heavy inventories of ingots and semi-finished steel.
- (5) Lead times are being drastically shortened, and mills are using their semi-finished stocks to make good on promises of quickest delivery.
- (6) Customers are demanding and getting quality, service, freight absorption, and quick delivery.
- (7) Rate of new orders is increasing, but individual order size is small and tonnage gain is slight.

Mills are now operating on the more realistic production cycle basis. Oddly, top brass are having trouble getting their own people to adjust. But it's beginning to sink in because it's the only way to get the business.

It's remarkable the change that has occurred in new business during the last 5 months. Where consumers once were placing orders 60 to 90 days and more ahead, they are now asking and getting much quicker delivery.

Some companies are amazed at plotted curves of this. For instance, mills last week were still taking orders for March delivery on products such as bars and some structural items.

On cold-rolled sheets the mills like to work on an 8-week production cycle, certainly not less than 6 weeks. Yet, today, some mills are promising delivery of cold-rolled sheets in 3 weeks. How? They've built up an inventory of slabs and hot-rolled material behind their cold mills, and thus can turn out cold-rolled sheets quicker.

#### Mill Stocks Very High

This is happening in other products, too. Delivery time is becoming more and more important in getting business.

Heavy mill inventory of semifinished steel is largely responsible for the March decline in steelmaking.

A reliable source estimated that mill inventories of ingots and semi-finished steel were more than 2 million tons above normal at the

March 11, 1954

first of the year. They have risen sharply since.

In the past several weeks furnaces were kept going longer than justified by current business. Reasons were (1) building stocks for quicker customer service, (2) hope of an early upturn in business, (3) inertia.

When it became clear that the upturn in business would come later than expected, some mills had to make fairly sharp cutbacks in production. So what might have been a very mild decline of production several weeks ago was held back and finally registered as a dip big enough to worry a lot of people.

A careful check of steel centers finds no alarm. Opinions vary but optimism prevails. Competition is terrific. And some producers are squeezed. But there is no panic—only hard-driving for business. Some steel people seem actually relieved that they have been able to take a lion's share of the economic adjustment without being badly hurt.

Following are condensed reports of conditions in the districts:

Pittsburgh . . . No one knows the full story of what will happen. but two things are mentioned most often: (1) Steelmakers badly misgaged customer's inventories. (2) Quick delivery is an absolute must in getting new orders.

It is practically impossible for mills with marginal equipment to compete. Emphasis is on quality, efficiency, prompt delivery. And woe to the mill that can't come through on all three.

Impression is that steel people feel this isn't the time for pessimism. There's no question that backlogs have shrunk, but this is discounted by shrinking of the delivery cycle. Once most customers are adjusted to shorter delivery cycle, producers feel they'll be able to draw a bead on their real market. If there's no upturn in business then they'll know they're in real trouble.

# Steel Operating Rates Week Beginning Pct of Capacity Jan. 3 75.4

74.3
743
74.1
75.6
74.4
74.4
74.6
73.6
70.5
69.0

Warehouse people are finding business tough. One source reports he's doing only about 55 pct of November 1953 volume. Structurals are holding up; but wideflange beams are easing somewhat. Some price cutting is going on and some secondary material is being dumped. Flat-rolled material is very competitive. Stocks are "well rounded," best in years. Major houses are holding firm on base prices, meeting competition only on freight absorption.

Hot-rolled bar producers are writing off first quarter business as pretty sad. But they say things are beginning to perk up a bit for second quarter.

Industrial fasteners producers are showing signs of life, and bar mills are optimistic for a pick up in agricultural implement business. A big letup in large-sized bars is traced directly to defense cutbacks.

Stainless order volume has picked up, with some producers now looking for a good month in April.



Wire business is also coming back some. Wire and lawn fence picked up in first quarter, and merchant products are now showing signs of life.

A large producer of oil country goods will operate at capacity through the second quarter. But looks for more competitive conditions after that, both because of fewer well drillings and the entry of three new mills into production.

East... Operations have eased recently, but some products are holding surprisingly well. Structurals are holding on basis of good industrial and highway building, also more than considerable bridgework. Competition is keen.

Pig iron market is softened by price cutting on foreign material. Premium prices on plates are gone, although freight absorption is not much of a factor as yet.

Warehouse business has taken a shellacking, but they believe the worst is past. Stocks are in good shape, and warehouses have benefited by mills recycling secondary material as scrap.

Cleveland . . . Steel men here look for the operating rate for the year to wind up around 75 to 80 pct. Inventory shakedowns are holding operations in check now. Some smaller producers have been hovering around 50 pct of capacity.

There is plenty of open space on March order books, some mills report 50 to 60 pct still open. New orders generally are balancing shipments, which is more than could be said a few weeks ago. Wide-flange beams are the only items that are not plentiful.

Alloy means a lot in this district, and there are more optimists than pessimists. One alloy producer is moving at 70 to 75 pct now, a gain of 20 pct over last November.

Rate of new orders for wire is improving. And seasonal demand is expected to push it along.

Producers here are looking up.

## **Scrap Prices Predict Steel Rate—Sometimes**



expect a gradual rise in business. Metalworking plants have laid off some people but there have been no important shutdowns, and the 5-day week is still prevalent. Consumers have been chewing up steel faster than they've been buying it so far this year.

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Detroit . . . Market here hinges on the spring car selling "boom." Consensus is that the market will get progressively stronger in next 3 months and then fall off. Early model changes, however, may ease the late summer and early fall drop in steel buying.

March steel sales were short of expectations. Feeling is that both auto and steel people oversold themselves on strength of auto demand. One local producer is trying to work off semi-finished stock that became top-heavy.

Detroit area mills are extending their territory, opening new offices, and absorbing freight to increase their share of business.

There are no premium prices in Detroit, only token differentials by smaller producers. In some cases mill are willing to absorb differential, plus freight to compete in

Cleveland, Buffalo, Chicago areas.

Alloy bar steel business is disappointing, but plates and structurals are showing surprising strength. Seasonal upsurge in galvanized business is in full swing.

A cheering note is revival of buying by Chrysler, which had been virtually out of the market for months.

Chicago ... Number of new mill orders is up 30 to 50 pct, but individual orders are mostly for small tonnage. It is not yet an indication that total output will rise in March or April. Medium and small mills were first to feel decline several months ago, and are feeling more pickup now.

Hot and cold-rolled sheets are holding their own or easing, depending on the mill. Structurals are still a strong but easing item. Seamless pipe is in strong demand, actually overbooked by one mill. Bars are weak, but moving up. Small bar mills supplying farm equipment trade are gaining. Galvanized and tinplate continue to hold a good level. Wire products are steady.

Farm equipment people are buy-

ing well, but may ease in April. Freight car builders indicate their need for plate and structurals, both strong items, will ease.

West Coast . . . "This short delivery business is turning mills into warehouses. . . . Besides absorbing freight customers want delivery in days, not weeks." That's how one western steel man described his market.

Mills are finding it increasingly difficult to schedule production to suit the customer. Lead time is evaporating. Even can companies which used to carry a 6-month inventory are trying to hold it to 45 days—despite the fact they expect an overall increase for the year.

Bottom is falling out of plate demand for the first time in 10 years, according to one source. Refinery work and pressure vessels are expected to take up the slack about midyear. Only tight item in area remains wide-flange beams.

One mill reports steady improvement monthly since suffering a bad drop at the end of 1953. Another mill is selling its home scrap and increasing the hot metal charge to use up its pig iron.

March 11. 1954

# **Zone Melting Purifies Germanium**

Impurities cut to 1 part in 10 billion . . . Molten zone moved along ingot . . . Impurities collect at end . . . Transistors bring need for purity . . . Other uses loom—By R. L. Hatschek.

How pure is pure? Bell Telephone Laboratories raises this question with a recently developed method for cleansing germanium. Impurities remaining are so low that a mass spectrograph, capable of detecting as little as 1 part impurity in 10 million, draws a complete blank.

By other measuring techniques, the impurity of Bell's germanium has been determined at 1 part in 10 billion. Bell figures this is equivalent to a pinch of salt in 35 freight cars of sugar and states that this may be the purest material in existence.

#### Move Molten Zone

Proof of the method's value is the wide acceptance it has gained among transistor manufacturers both in the U. S. and Europe. Highly purified germanium needed for transistors has been produced by this method over a year.

The deceptively simple tech-

nique is known as "zone melting" and was invented by W. G. Pfann of Bell Labs' Chemical & Metallurgical Research Dept. Used in purifying substances it's called "zone refining" and when used to prevent segregation in making large single crystals it's called "zone leveling."

The refining operation is based on the fact that impurities are not equally soluble in the solid and liquid states of a substance. Generally the solubility in a liquid is higher. So the trick is to slowly move a narrow molten zone down the length of an ingot. The moving molten zone then carries impurities with it, concentrating them in the end of the ingot.

A series of circular induction heaters accomplishes just this. In the case of germanium, the ingot moves through the heaters at about 0.1 in. per minute and is heated to 1760°F. Ingot is carried through in a container to prevent it from

falling apart while in the heater.

With present equipment, a pound or so of germanium takes a "couple of hours" for purification. But Mr. Pfann points out, "We've got plenty of time." Current practice is to use an ingot of about 1 sq in. cross section, though this seems to be limited only by the size of the equipment.

Efficiency of the operation, of course, depends on the ratio of solubility in the solid to solubility in the liquid. As long as this is less than unity it is possible to purify the substance. This "distribution coefficient" in the case of germanium and its unwanted impurities is approximately 0.2.

#### Check Electrical Properties

Where the impurity is insoluble, zone refining will not work. But insoluble impurities are more easily removed by other methods and the "raw" material germanium used is actually of a high purity by usual standards—containing no more than 1 part impurity per 100,000.

If a mass spectrograph cannot find any impurity, how is this determined in metal 99.9999999 pct pure? By measuring certain electrical properties, such as conductivity and Hall coefficient, at extremely low temperatures.

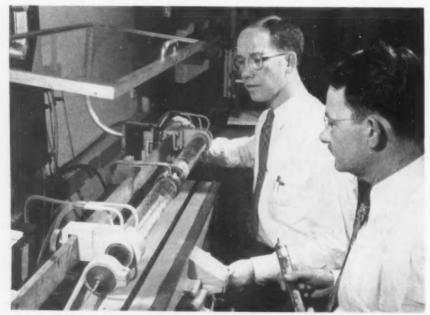
After purification the electrical properties of the germanium are tailored to transistor requirements by controlled additions of elements such as arsenic and antimony.

#### Costs Are Low

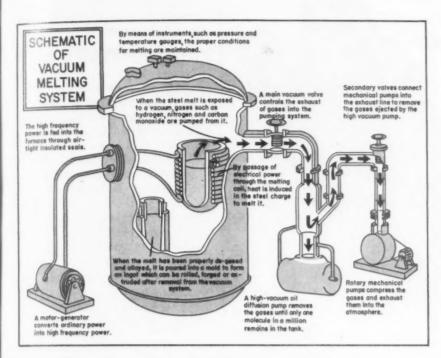
A less evident advantage of the zone refining technique is that analysis of the cropped end permits identification of impurities that may have been present in quantities too minute for detection in the original ingot.

Costs are not high. Equipment is relatively simple.

Other materials — metals, semiconductors and various organic and inorganic substances—can also be purified by zone refining. Tin and antimony have been produced in highly pure form



ZONE MELTING, a new refining method developed by Bell Telephone Labs produces germanium 99.9999999 pct pure. W. G. Pfann (left) inventor of the process works with J. H. Scaff who helped in development.



# **New Partnership In Vacuum Melting**

Crucible Steel and National Research Corp. enter partnership for vacuum melting . . . Crucible's share in Vacuum Metals subsidiary is 50 pct . . . To make high temperature metals.

Commercial production of vacuum-melted steels and other alloys will be greatly expanded under a joint venture between Crucible Steel Co. and National Research Corp.

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The companies announced that Crucible has acquired a 50 pct interest in Vacuum Metals Corp., formerly a wholly-owned subsidiary of National Research. The deal was consummated under an arrangement whereby Crucible turned over 25,000 shares of its stock, worth approximately \$600,000 and agreed to provide \$500,000 in preferred stock to finance new equipment.

#### Vacuum-Melted Steel Use Mounts

One of the first steps will be installation of a \$250,000 furnace plus auxiliary equipment which will expand capacity 500 pct to \$0.50 tons per month within the next year. The facilities will be installed at Crucible's Syracuse, N. Y., plant. Furnace capacity will be 6000 lb per day.

facuum Metals reported early

last year (THE IRON AGE, Apr. 2, 1953, p. 155) that fatigue and impact properties of vacuum-melted 52100 were found to be better than similiar properties of commercial 52100 steel. Last January the company began commercial production of high temperature alloys at its Cambridge, Mass., plant, culminating 7 years of research. The company also produces high purity copper and beryllium copper.

#### Heat Resistance High

Vacuum-melted steels are finding important applications in the aircraft, electronic, and automatic process fields. From a high temperature standpoint, the producers claim this special steel will resist temperatures of 1500°F. and may possibly stand up at 1600°F, making it an extremely important material for turbine blades and other high temperature applications in jet engines. Jet engine manufacturers already are using the material.

In the production of vacuum

metals, standard commercial raw materials are used. Some scrap also has been processed. The metal is melted, refined, and cast in a vacuum. In finished form, largely bars and rods, it sells for \$2 to \$10 per lb. Annual sales to date have amounted to approximately \$1 million.

Officers of Vacuum Metals Corp. will include Joel Hunter, executive vice president of Crucible, chairman; Richard S. Morse, president of National Research, president; L. L. Ferrall past, asst. vice president-operations, Crucible, vice president; and Robert A. Stauffer, vice president and director of research of National Research, vice president.

### Iron Ore:

# Radioactive concentrates test use of unpellitized fines.

Ford Motor Co.'s Steel Div. has used radioactive concentrates of low grade ore to determine feasibility of using unpellitized powders in the blast furnace charge.

Researchers reported that a "surprisingly" large amount of the fine ore particles, about 60 pct, was retained in the process. The conclusion, however, was that this was "somewhat too low."

#### Powder Too Light

It has been generally assumed throughout the steel industry that low grade concentrates in powder form are too light to be charged directly into the blast furnace. Pellitizing the powders is an expensive operation and one of the drawbacks to use of low grade ores in blast furnace operations.

In this respect, the test proved a previously drawn conclusion. However, it is an important step in use of radioactive tracers in the steel industry and was the first time they were used to test the need for this extra step in steelmaking.

It was also one of the largest quantities of radioactive material ever involved in an industrial experiment. Ford has been a leader in the use of radioactive tracers

rch 11, 1954



through its new Radioactive Isotopes Laboratory,

#### Use Own Ore

Seventy-six tons of the radioactively tagged ore were fed into the "Benson Ford" blast furnace at the Rouge plant. Amount of material actually ending up as pig iron, compared to that expelled and trapped in the dust-collection system, was determined by checking the radioactivity of the pig, slag and expelled dust.

The ore concentrates used in the test came from Ford's own low grade ore project at Humboldt, Mich., in which it is engaged jointly with the Cleveland Cliffs Co. The ore is a common type of Upper Peninsula jasper and was 35 pct iron hematite.

#### Slows Research Need

The first of two processing units will be in operation later this year and a second one is also being constructed for a total annual capacity of 400,000 tons. The samples were processed in the pilot plant of Cleveland Cliffs at Ishpeming, Mich.

Although the tests proved that it is impractical to charge a blast furnace with the powder concentrate, they also convinced Ford researchers that further study should be made into adherence of iron particles, and that this research might eventually point to a better method of using low-grade ore concentrates.

#### Bombarded With Neutrons

First steps of the test were launched 7 months ago when a 5-lb lot of powdered iron ore concentrate was welded inside an aluminum container and sent to the AEC at Oak Ridge, Tenn.

It was bombarded in the nuclear reaction pile for 8 days with neutron rays, then blended in giant cement mixers with 22 tons of identical iron ore powder. Then, 54 tons of a second type of iron ore were added to obtain the final mixture fed into the furnace.

Despite the large amount of material involved in the test, the level of radioactivity was so slight it was completely harmless to personnel conducting the experiment. Radioactivity was 100 times below the safety level prescribed by AEC.



Streamlined design of the new T-J Spacemaker eliminates tie rods...

saves up to 40% in mounting space! It's performance-proved... super rugged with extra high safety factor... solid steel heads... heavy wall, precision honed, hard chrome plated, seamless steel body... leakproof cylinder head to body construction... heavy duty, hi-tensile, hard chrome plated piston rod.

Available with the new T-J Super Cushion Flexible Seals which insure positive cushion with automatic valve action for fast return stroke. Many standard sizes and styles . . . for pushing, pulling, lifting, clamping or control jobs. T-J dependability. Write for bulletin 454. The Tomkins-Johnson Co., Jackson, Mich.

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# Rails Move to Recoup Steel Freight

Eastern railroads ask rate cuts to regain steel shipments lost to trucks . . . Add new items . . . New scale scheduled for Mar. 26 . . . But truckers will fight—By J. B. Delaney.

Coming up: Another round between eastern railroads and truckers over the iron and steel shipping dollar.

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The stakes are high, and both sides are playing for keeps.

So far, the trend has been against the railroads. Since the war, trucks have been grabbing off an ever-increasing share of iron and steel business from the rails.

#### ICC Studies Rates

Four years ago the railroads made a stab at recovering their losses by installing reduced rates on 80,000-lb minimum shipments of iron and steel articles susceptible to movement by truck.

This didn't help much, if at all. Now the rails are winding up a Sunday punch in the form of still lower rates on both 40,000 and 80,000-lb minimums, and have broadened the list of products covered.

The new scales are now before Interstate Commerce Commission and will become effective Mar. 26 unless blocked by the truckers, who have filed protests. Their objections probably will be aired before ICC some time this month.

#### Steel Shipments Off

It's a serious matter for the railroads. ICC approval of the new rates would be only the opening gong. Since the reductions average about 20 pct they must pick up at least that much business to maintain their present position. And that won't be easy.

To begin with, iron and steel shipments have fallen off, so the pot they're fighting for a share of is smaller. For example in January overall shipments on a large railroad serving the Pittsburgh district dropped 27 pct from the same month a year ago. Decline in steel shipments accounted for a large share of this drop. Second, some truckers are going to meet the competition.

Reduced carloadings recently prompted the Pennsylvania Railroad to halt work on a \$27 million improvement program at its Pittsburgh terminal.

In their protest to ICC, the truckers are asking first for a suspension of the proposed rates. They also are petitioning for an investigation of iron and steel rates generally, and subsequent imposition by ICC of minimum charges by both rails and truckers. Some truckers say they would be happy to settle for minimums 6 pct above rail minimums. They say the proposed new rail rates are as much as 25 pct below the present 32,000-lb truck rate.

The truckers further claim they have the support of shippers in industries other than iron and steel. One source contends non-steel shippers feel they are indirectly subsidizing the railroads' fight for steel business through recent rate increases on their shipments.

#### Limit Fabrication in Transit

The railroads' proposal to ICC includes additions to and modification of the iron and steel list to which the reduced rates would apply. Additions include some semifinished articles.

The new rates would not apply on import or export traffic, and

# Proposed Iron & Steel Freight Rate Changes

The eastern railroads have proposed the following amendments and additions to proposed motor competitive rates on 40,000 and 80,000 lb minimum iron and steel shipments:

#### Pipe and Tubing

Amend entries to provide for maximum outside diameter of "14 in. or less" in lieu of "6-% in. or less."

#### Wire Products

Add the following articles: Wire rope or strand, with equipment of iron or steel chain, clamps, clips, hooks, sockets, shackles, thimbles, turnbuckles or coupling links attached, or without equipment. Wire strand, galvanized, lead coated or plain.

#### Castings and Forgings

Add castings and forgings, in the rough, except stove castings, sut ect to restriction to individual pieces weighing 32,000 lb or (Previous record contemplated restriction to 4000 lb or less.)

#### Reinforcement Bars

Revise present entry to read: "Bars, reinforcement, in lengths are exceeding 35 ft, or in coils (without restriction as to length)."

Bolts, Nuts, etc.

Add bolts, nuts, rivets, screws, spikes, staples and washers.

#### Blanks, Stampings or Unfinished Shapes

Add blanks, stampings and unfinished shapes.

#### **Fence Posts**

Add fence posts.

#### Plate:

Add the following articles, subject to new 40,000-lb rates only: Plate, boiler, including flanged plates, braces, and lugs; plate, nail; plate, plain or galvanized, not including armor nor deck plate; plate, plain, may be primed, leaded or tarred with one coat only to preserve from rust; plate, tack; plates, floor; plates (structural). Articles named may have holes when for fastening or fitting purposes only.

#### Billets, Coiled Rods & Skelp (Semi-Finished Steel)

Add billets, coiled rods and skelp, in straight or mixed carloads, without further qualification as to description. The tariff will provide that the new 40,000 and 80,000-lb rates in cents per 100 lb will alternate with existing gross ton commodity rates on these articles.

## **Bargaining:**

# NLRB decision will end spread of plantwide negotiation.

National Labor Relations Board has ended the spread of the plantwide bargaining principle to additional industries.

This decision was arrived at last week when NLRB turned down an application by American Potash Co. and two of its four unions for plantwide bargaining.

#### Won't Change Existing Plans

NLRB has no intention of upsetting the pattern already established in the steel, aluminum, lumbering, and wet milling industries. However, it will continue to refuse to consider petitions for craft or departmental split-offs where plantwide bargaining now prevails.

At the same time, NLRB wants to make it clear that it is dropping the practice of denying craft severance in industry after industry merely on the basis of integration of operations.

Known as the National Tube doctrine, refusal to permit carving craft units from plantwide bargaining groups was first applied to the steel industry because of its highly integrated operations.

#### End Union Splits

The doctrine was later applied to aluminum production, lumbering, and wet milling for the same reason. Also, says NLRB, historical patterns for the four industries was that of single group bargaining.

Now, NLRB is convinced the National Tube doctrine has been carried far enough. To carry it any further would be to go against the will and intent of Congress as expressed in labor committee reports.

However, to head off a possible rash of union raids, NLRB is putting into effect a stricter set of rules under which one craft union may split off from another.

Primarily, separate representation will be granted only where "a true craft group is sought and where, in addition, the union seeking to represent it is one which traditionally represents that craft."

### **Benefits:**

# Cleveland plants pay 30c per manhour in fringe benefits.

Industry's hidden payroll of fringe benefits has risen 6¢ per man-hour since 1951, according to a recent survey of Cleveland manufacturers.

The survey, made by Associated Industries of Cleveland, revealed that 160 local firms employing 74-647 hourly workers were paying an average of 30.83¢ an hour over and above direct wages for services and benefits to workers. The AIC's 1951 survey pegged the fringe benefit average at 24.77¢ per manhour.

#### What They Cost

At 30.83¢ per hour the average fringe payment is slightly higher than the 1939 minimum wage rate of 30¢ per hour.

Of the 20 benefit items listed in the AIC's current survey, each company paid an average of 10.3 of them. This shows a fractional increase over the 1951 average of 9.9 different benefits paid at that time.

Average cost per hour of some of the major items on the benefit list were: Profit sharing, 10.16¢; pensions, 6.78¢; vacations, 5.28¢; rest periods, 4.16¢; holidays, 3.43¢; old age insurance, 2.48¢ and hospital insurance, 2.28¢.

#### Depends on Workweek

Benefit costs increase in direct proportion to the length of the work week which has been longer than the standard 40 hours. Fringe costs would have been higher if figured on the basis of the average work week.

- Transportation
Continued

#### Railroads Versus Trucks

	Present Ro	ites	Proposed Competitiv	
		(¢ per	100 lb)	
	40,000 lb	80,000 lb	40,000 lb	80,000 lb
From Pitts	burgh			
To				
Muncie, Ind.	52	37	40	35
New Castle, Pa.	18	11	13	12
New York	62	50	55	50
Philadelphia	54	42	45	40
Toledo	44	30.5	34	29
Detroit	51	35	40	35
Hartford	70	59	68	63
Cincinnati	51	35	40	35
PLUS 1	5 pct temp	orary incre	ease 3	pct fed-

under ex parte 175 and 3

\*Not subject to further increase

pct federal tax

fabrication in transit will be permitted in connection with the new 40,000-lb rates only.

ICC recently okayed new motor-

competitive rail rates on iron and steel shipments in the South and from the Eastern Territory to the South. Cuts were up to 25 pct.

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# **FOUNDRIES: What They Do for Workers**

New survey points out average foundry's employee relations policy . . . Many don't have pensions, profit sharing plans, escalator clauses . . . Time-and-half pay common.

The average, medium size foundry is working hard to keep its employees content. For the foundry operator, who doesn't know where to draw the line on employee benefits, the National Foundry Assn.'s recent survey of foundry labor agreements is a handy check-list.

Survey shows the average foundry hasn't inaugurated pension and profit sharing plans, Christmas bonus plans, and cost-of-living escalator clauses. But it's thinking about them.

#### Vacation Policy

On the other hand, the foundry owner is paying employees for 6 holidays per year at the hourly rate, and if the employee works on one of the holidays he gets his regular pay rate plus holiday pay.

The average foundry employee gets one week's paid vacation after one year's service, rates 2 weeks' vacation pay after 5 years. Usual practice is for foundries to close down for one week per year during the vacation period. Employees get an extra day's vacation if their vacation covers a period in which a legal holiday falls.

#### Time-and-a-Half Standard

Seniority is usually departmenal, but is set up on a plantwide basis when layoffs become necessary. Failure of an employee to report within 5 days after the recall order that follows a layoff, can mean a loss of seniority in the average foundry. Superseniority isn't, as a rule, granted to union stewards and shop committeemen.

The study goes into actual pay rates, too. In the average foundry, time-and-a-half pay is given for any work over 8 hours per day or a 40 hours per week. Saturaty work is on a time-and-a-half basts. Sunday, double-time.

#### Foundry Incentive Plan Practice

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		dries orting
	Yes	No
Individual incentives	229	564
Group incentives	47	746
Both group and individual incen-		
tives	258	
Union participates in setting rates	106	427
Employees allowed to object to		
rate through grievance pro-		
cedure	423	110
Contract provides for rate restudy		
in case of error	294	239
Contract provides for rate restudy		
in case of methods change	367	166
Earnings guaranteed when output		
is reduced through no fault		
of worker	354	179
Special Wage Provisions:		
Cost of living escalator	154	896
Productivity adjustments	60	991
Profit-sharing plan	72	979

Work on the second shift in many foundries merits  $5\phi$  to  $10\phi$  per hour more than regular hourly pay rates—third-shift workers get  $3\phi$  to  $5\phi$  per hour more than second shift workers. Included in most of the wage agreements is a 4-hour minimum if the worker is called in, or isn't notified the day before that he won't be needed the next morning.

#### Most Are Union Shops

On other policies foundries vary greatly. About half the mediumsized foundries surveyed have an incentive pay system. Of the half, 50 pct base incentive payments on individual output, 50 pct on per-



"Shows what an incentive system will do."

formance for groups of workers.

Three out of four foundries have unions. While no figures were given, it appeared that in the majority of cases the union is the American Federation of Labor's International Molders and Foundry Workers Union.

The survey covered 1052 foundries in the U.S.

#### Insurance:

# Mitchell seeks states help on unemployment insurance.

Action by state and territorial governors in bolstering the unemployment insurance system is being sought by U. S. Labor Dept.

Recently, Labor Secretary James P. Mitchell wrote to the governors, asking their cooperation in extending the system to more persons, improving benefits, protecting state funds against insolvency.

He called attention to President Eisenhower's suggestions concerning unemployment insurance in his State of the Union message and economic report. The President asked for broader coverage of the system, higher weekly benefits for the jobless and payment of benefits over a longer period.

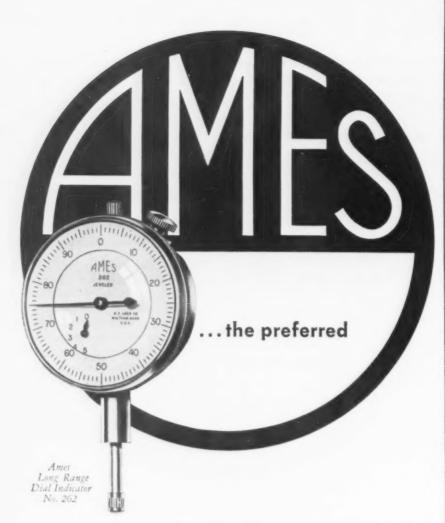
Mr. Mitchell also noted that the Federal Advisory Council on Employment Security recommended in January a maximum weekly unemployment benefit "equal to at least 60 to 67 pct of the state's average weekly wage."

#### Strikes Drop as Labor Loosens

Loosening of the labor market is showing up in the form of fewer labor-management disputes, fewer strikes, and a smaller amount of lost work time.

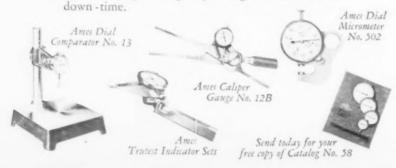
Preliminary estimates by the U. S. Bureau of Labor Statistics indicate that only 250 new strikes, counting those involving as few as six workers, began during January.

About 80,000 workers were involved and no individual stoppage included as many as 10,000. Total strikes in effect during the month, counting those carried over from previous months, added up to 400.



... not because they cost more (in the long run they're more economical) but because they're completely *impersonal*. They do their measuring jobs absolutely independent of the human hand.

For more than 50 years, Ames Micrometer Dial Gauges and Indicators have kept pace with increasingly critical precision requirements. Today, each part of every Ames product is carefully built by exclusive Ames methods and machines from the materials best suited to its function — and 100% checked for accuracy. As a result, all Ames products are extremely accurate and sensitive, yet rugged and tough — to give you *longer* service with *less* 



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### **Credit:**

#### Westinghouse funds a \$10 mil. lion plan for dealer credit aid,

The board of directors of the Westinghouse Electric Corp. recently approved a new plan to provide additional financial assistance for retail dealers.

The company will organize a credit corporation, a wholly-owned subsidiary capitalized at \$10 million, to aid Westinghouse appliance and radio-television dealers in obtaining inventory and retail sales financing.

The new organization will supplement the 6-year-old Westinghouse Equity Plan, under which more than 4500 banks and credit agencies are providing local financing for the company's retail dealers.

The first office of the credit corporation will probably be opened in mid-April to serve dealers in the states of Pennsylvania, Ohio, West Virginia, Kentucky, Michigan, Indiana, New York and Maryland.

For the fourth consecutive year Westinghouse sales reached a new high level above the billion dollar mark. The company's annual report showed 9 pct gain over 1952's net sales to an all-time record of \$1,582,047,000. Westinghouse net income for 1953 was 4.7 pct of sales, or a total of \$74,322,000.

#### **Business to Handle Korea Funds**

Most of the millions of dollars worth of procurement for Korea with Foreign Operations Administration funds will be carried out through commercial channels.

Although such deals are not often in large amounts, the range of products is broad including steel products, nonferrous metals, machine tools, trucks and parts, building materials and other items.

Commercial purchases will be made largely by Korean importers who will be granted subauthorizations. In keeping with government policy, lists of Korean traders can be obtained from any U. S. Commerce Dept. field office for \$1.

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Must tear down faulty transmission in M47's, M48's.

Army and civilian mechanics are working to repair a faulty assembly in the transmission of each of some 6450 M47 and M48 tanks built within the past year and delivered for service in this country and overseas.

This corrective project was begun, the Army says, after 1st Armored Div., at Fort Hood, Tex., reported that transmissions had been damaged in "three or four" tanks. Investigation revealed a malfunction of the stator assembly in the cross-drive transmission of these tanks.

Some screws in the assembly were said to have backed out of position, colliding with working parts. Cause of trouble, according to the Army, dates back to about mid-March, 1953, when GM's Allison Div., with Army approval, discontinued staking the screws and began to fasten them in place by a torqueing method.

To forestall further damage, the Army ordered that transmissions in those tanks already issued—some of them to National Guard units—be taken apart and the screws staked down. Actual staking is not difficult, but the labor involved in disassembling and reassembling each transmission is about 33 man-hours.

Total cost of this work is not yet known. At Fort Hood, the Army says, where an unnamed number of assemblies are being repaired, the maximum cost probably will be not more than \$60,000. Army officials are trying to determine whether the military or the builder must pay the bill.

It is expected that screws of the type which have given trouble will be staked down in assemblies yet to be built.

#### Ask Industry Titanium Setaside

Business & Defense Services Administration is considering the issuance of an order which would reserve a percentage of titanium mill products for industrial use.

Spokesmen for the industry, in-

cluding both producers and fabricators, have reported to the government that the military take of titanium for aircraft frames and engines has not kept pace with expansion of production facilities.

Industry feels that some should be turned loose for use in making civilian products and thus begin to develop a civilian market.

It is also running into problems in connection with titanium scrap. Engine and aircraft contractors are still complaining about accumulations of scrap which they can't return to producers and fabricators.

# **Metallurgy:**

New iron-aluminum alloy may cut nickel, cobalt needs.

Routine laboratory work on physical characteristics of a recently developed iron-aluminum magnetic alloy paid off in an unexpected dividend — a new high-temperature alloy.

Naval Ordnance metallurgists J. F. Nachman and W. F. Buehler noticed high heat resistance in the 84-pct iron, 16-pct aluminum alloy, 16-Alfenol, and did some more research that resulted in Thermenol.

Small additions of vanadium or molybdenum plus an undisclosed heat treatment gave an alloy that shows up "better than some forms of stainless steel being widely used in the aircraft industry today" in creep-rupture tests at 1200° F.

Other desirable characteristics

showed up: High tensile strength, high resistance to corrosion and oxidation. And it's 20 to 25 pct lighter than stainless.

#### Many Uses Possible

What interests the metallurgists most is that the new alloy indicates the possible elimination of "classic" high-temperature alloying ingredients—nickel, cobalt and chromium—in the 1200° F range.

Thermenol can't take over the extremely high-temperature market. It can't compete with the high-cobalt "super alloys." Neither will it supplant titanium. But the combination of light weight plus heat resistance assures close inspection by aircraft manufacturers. And high electrical resistivity may enable its use in low-temperature furnaces, heater elements and electrical appliances.

Testing is continuing at the Naval Ordnance Laboratory, White Oak, Silver Springs, Md., where it was discovered, and at the National Advisory Committee for Aeronautics' Lewis Flight Propulsion Laboratory in Cleveland.

in Cleveland.

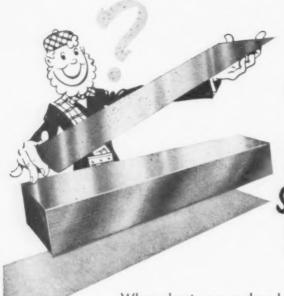
#### Colombia Buys U. S. Jet Trainers

Lockheed Aircraft Corp. will deliver to the government of Colombia six new T33 jet training planes, paid for by the South American country in early March.

Colombia is the first country in either Central or South America to buy U. S. jet aircraft. A representative of its Washington embassy paid for the planes with a check for \$1.1 million, representing

# Fabricated Structural Steel Contracts, Shipments, Backlog

Estimated Net Tons 1953 Avg. 1947-50 CONTRACTS CLOSED January 167,036 266,944 161,976 SHIPMENTS 240.637 241,392 January 166,910 BACKLOG 1,686,385 2.179.777 1.237.285 Source: American Institute of Steel Construction



MANY POUNDS STAINLESS SHEET?"

When sheets are ordered by gauge number, permissible A.I.S.I. thickness variation is plus or minus 10%. Thus, if you order standard 18 gauge 36"x 120" stainless sheets you may receive .052" thickness—while your job might actually require about .0475". And in the matter of weight, the theoretical weight of this same standard sheet is 63.00 poundsbut it may permissibly vary between 59.22 and 65.52 pounds. Remember, you purchase sheets by weight.

> MicroRold Stainless may be ordered rolled to the "light side" of the gauge range. MicroRold Stainless may be held within a 3% tolerance—with such microaccuracy that you are assured constant uniformity throughout your sheet or strip. And since each one-thousandth inch saved in thickness saves 1.26 pounds per sheet, MicroRold's amazing thinness control may well save you money.



Ask your steel warehouse distributor about MicroRold Stainless.

Washington Steel CORPORATION

WASHINGTON, PENNSYLVANIA

the actual cost of the trainers plus a year's supply of spare parts,

The T33 is a 600-MPH, two-seat version of the Lockheed F80. It is used extensively by the Air Force for transition training of pilots switching from piston-engine to jet aircraft.

#### Get the Facts from the Navy

Industrial laboratories and colleges performing research projects have been told by the Navy that copies of a revised, up-to-date chart of Physical Constants & Conversion Factors are available on request.

Contained in the chart is a list of numerical values of about 30 of the more important fundamental constants, as well as tabulations of certain physical conversion factors. tables of significant properties of standard atmosphere at selected altitudes.

#### Contracts Reported Last Week

Including description, quantity dollar values, contractor and address. Italics indicate small business representatives.

Pullover gage kits and spare parts, 100, \$55,854, Action Mfg. Company, Philadelphia, I'a.

Construction of aircraft carriers, 1, \$118,250,000, Newport News Shipbuilding & D/D Co., Newport News, Va.

Construction of destroyers, 3, \$53,022,000, Bethlehem Steel Co., Quincy, Mass.

Disconnect switch, 1000, \$84,800, Emple Switchboard Co., Inc., Brooklyn, N. Y.

Compressor, air, 8, \$127,057, Ingersoll-Rand Co., Washington, D. C.

Head, molded, 30000 ea, \$75,173, Waterbury Companies, Inc., Waterbury, Conn.

Projectile, practice, 2000000, \$420,000, G.M. Co. Mfg., Inc., Long Island City, N. Casing burster, 1129970, \$61,018, Eise Brothers, Inc., Hoboken, N. J.

Shell, HEI, 20 MM, 2000000, \$450,000, American Safety Razor Corp., Brooklyn, N. Y.

Replenishment of combat vehicle parts.

American Safety Razor Corp., Brooklys. N. Y.
Replenishment of combat vehicle parts, 3125, \$66,375, R. G. Le Tourneau, Inc. Longview, Texas.
Gun, machine cal. 30, 18752 ea, \$9,022,570, Saco-Lowell Shops, Boston, Mass.
Aluminum lockers, 160, \$10,71, Haris Hub Bed & Spring Co., Scranton, Pa.
Engine parts, 166, \$102,254, Boeing Amplane Co., Seattle, Wash.
Motor generator sets, 5, \$96,615, Westinghouse Electric Corp., Washington, D. Fixture, lighting, 5500 ea, \$68,53, Lovell Dressel Co., Inc., Arlington, N. J. Generator sets, 873, \$3,381,998, Hobat.
Brining parts, tools and equip, \$5,006,600, Northrop Acft., Inc., Hawthorne, Cal. Firing device, pull release type, 123,073, Bayshore Industries, Inc., Editon, Md.
Drill kits plus replacement parts, 200.

\$123,073, Bayshore Industries, Inc., Eston. Md.
Drill kits plus replacement parts 900, \$273,825, Charles T. Brandt, Inc., Ballsmore, Md.
Shackles, bolt pin. \$52,080, Graylor Electric Co., Inc., Washington, D. C.
Fin lock nuts, 111600, \$156,250, The Boehm Pressed Steel Co., Cleveland, Ohio.
Bodies for tracer Mk 11 for 40 Ml ammunition, 1835000, \$233,705, Dazer Corp., St. Louis, Mo.
Container, metal ammunition, 142000 et \$227,942, Lincoln Metal Prod., Corp., Brooklyn, N. Y.

# **Work Starts on Amapa Manganese Lode**

Construction begins on facilities at Amapa manganese ore mines in Brazil . . . But first ore shipment to U. S. won't come through until 1957-By R. L. Hatschek.

Construction has finally begun on railroad and port facilities in the jungles of Brazil's Amapa Territory. Work is part of the project of putting the territory's healthy manganese deposits to work (See THE IRON AGE, Jan. 15, 1953, p. 37).

Estimates place the reserves as high as 25 million tons of high grade ore. But Industria e Comercio de Minerios S.A. (Icomi), which holds the concession from the Brazilian government, has only proven 10 million tons of 46 pct or better ore. Reason for stopping at this figure was the original agreement with Brazil which permits export of up to 500,000 tons annually if 10 million tons were

Lode is owned jointly by Icomi (51 pct) and Bethlehem Steel Corp. (49 pct).

#### Will Finish in 3 Years

Under a contract signed with Defense Materials Procurement Agency in January 1953, shipments to the U.S. were to begin in 1956. This was based on the ascumption that construction work was to start last year. But, an Icomi spokesman told THE IRON AGE, continued negotiations with the Brazilian government delayed the starting date.

On Feb. 18 a contract was signed with Foley Brothers, Inc., construction engineers, to develop the 135-mile railroad up the Amaparl River to the ore beds and to build port facilities near the town of Macapa at the mouth of the Amazon River.

The consultant service contract for the railroad-port project had already been completed by Foley Brithers and actual work at the site began almost immediately. Job is expected to be finished in ab at 3 years.

Nothing but temporary structures have been erected at the mine. Construction of other facilities will be geared to permit shipments as soon as the railroad and port are ready. Initial boatload can be expected early in 1957.

#### 5.5 Million Tons for U. S.

Mining will be by open pit methods since the ore lies near the surface with many outcroppings. Crushing and screening will be done at the mine and ore will be railroaded downriver to the port. A series of waterfalls prevents practical barge shipment down the Amapari.

The U.S. contract involves 5.5 million tons of the high-grade manganese ore over an 81/2-year period. At least 70 pct of this to anage is to be offered to the U.S. with a total of 400,000 tons to be delivered for stockpiling and other defense needs. The U.S. government has an option on 30 pet of total production.

#### Need Source Near Home

Financing of the project was taken care of by an Export-Import Bank loan of \$67.5 million which was granted when the U.S. contract was signed. Principal of the loan is to be repaid by Dec. 31, 1965. The purchase contract runs to June 30, 1962, but would end on repayment of the loan at an earlier date.

Demand for manganese ore has eased noticeably in recent months. Lower steel industry operations combined with substantial stocks are the reasons.

This is a reversal from the market frenzy after Russia stopped shipments.

But with the necessity for importing 90 pct of U.S. industry's manganese requirements - and most of that coming from remote points on the globe-development of closer sources continues.

#### IRON & STEEL: January Output By Districts

As Reported to the American Iron and Steel Institute

BLAST FURNACE NET TONS DISTRICTS		PIG IRON		FERROMANG., SPIEGEL & SILVERY IRON		TOTAL				
	FURNACE								Pct of	Capacity
	Annual Capacity	Jan.	Year to Date	Jan.	Year to Date	Jan.	Year to Date	Jan.	Year to Date	
Eastern	17,261,850 29,501,270 8,714,680	1,214,838 1,876,450 587,926		16,972 19,249		1,231,810 1,895,699 587,926		7 84.0 1 75.6 1 79.4		
Chicago Southern Western	16,371,250 6,273,080 3,879,260	1,151,180 446,108 239,187		15,448 12,155		1,166,628 458,263 239,187		83.9 86.0 72.6		
TOTAL	82.001,390	5,515,689		63,824		5,579,513		80.1	,,,,,	

		TOTAL STEEL*					ALLOY STEEL		
STEEL -NET TONS				Pct of Capacity		Index**			
DISTRICTS	Annual Capacity	Jan.	Year to Date	Jan.	Year to Date	Jan.	Year to Date	Jan.	Year to Date
Eastern PittsYngstn. CleveDetroit Chicago Southern Western	25,864,060 44,348,060 12,791,780 27,371,700 6,932,340 7,022,470	1,584,814 2,820,344 836,287 1,764,994 500,332 444,715		72.1 74.9 76.9 75.9 84.9 74.5		114.3 99.5 136.8 113.4 143.6 118.2		86,972 365,033 49,003 92,350 4,712 6,208	
TOTAL	124,330,410	7,951,486		75.3		111.8		604,278	

\* Includes Alloy Steel.
\*\* Index of production based on average annual production of the years 1947, 1948 and 1949.

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3, Water-y, Conn. \$420,000, htty, N. Y. 18, Elsen \$450,000, Brooklyn,

icle parts, eau, Inc., a, \$9,022. Mass. 71, Harris en, Pa oeing Ab-

15, West-ton, D. C. \$68,756, ton, N. J. 8, Hobart p. \$5,000. forne, Cal. de, 138300. Inc., Elk.

sarts, 900, ne., Balti-Graybar D. C. 5,260, The and, Ohlo or 10 MM 6, Dazer

ON AGE

### Tools:

#### Commerce Dept. sees \$1 billion year for toolbuilders.

Domestic machine tool shipments in 1954 may run between \$100 million and \$200 million more than had earlier been estimated by either industry or government.

Industry sources in Washington, basing their estimate on sales for the first 2 months of 1954, figure the total for the year may well run around \$800 million. Government men are even more hopeful

As U. S. Commerce Dept. officials now see it, there is no apparent reason why shipments by the industry this year won't add up to more than \$1 billion.

Here's the way Business & Defense Services Administration officials now figure it:

As of Feb. 1, the industry had an order backlog of approximately \$600 million which it is whittling down at the rate of more than \$90 million a month (January shipments, \$95 million).

Also, Defense Dept. has assured BDSA it is planning to spend \$150 million for additional metalworking equipment by next July, independent of the Vance program.

Adding these figures together, BDSA comes up with \$845 million worth of business in machine tools and metalworking equipment without figuring in any new civilian orders.

Nor does this calculation include any potential orders to be placed from the \$250 million available to kickoff the Vance Plan program.

THE IRON AGE reported earlier this year that while the White House did not ask any additional Vance Plan funds in its new budget, in all probability something like 40 pct of the amount now available will be committed by June 30, 1955.

This is now confirmed by a high BDSA official who reports he has reason to believe that \$100 million (40 pct) of the amount now available will be spent by the end of 1954.



WORKERS prepare plates for electrolytic deposition as . . .

# **Electromet's Chrome Plant Opens**

First commercial production of electrolytic chromium has started at Electro Metallurgical Co.'s new 2000-ton plant at Marietta, Ohio. The new plant is located on the 750-acre Ohio River site of Electromet's recently built electric furnaces and the 7½-acre plant for production of the company's Simplex low-carbon ferro-chromium (THE IRON AGE, May 28, 1953, p. 70).

Electromet's development of a commercially feasible source of electrolytic chromium is keyed to such important uses as the production of chromium-bearing alloys for high temperature applications, particularly the nickel-base and cobalt-base alloys used in jet aircraft.

#### Technical Problems Solved

Basically the plant carries on two fundamental operations. First is a sequence of complex solution crystallizing and filtering to produce solutions suitable for electrolysis. Second is the actual electrolysis itself.

Electromet's plant is the result of long term research in adapting the basic electrochemistry of chromium deposition to large scale production. Preliminary investigation indicated the need for a raw material other than purified chromium oxide.

U. S. Bureau of Mines' basic process for using ferrochrome to produce an electrolyte suitable for the trivalent deposition of chromium provided a starting point for development. A fundamental requirement of the chromium source was a degree of purification to eliminate impurities from the ore plus a form from which the chromium could easily be dissolved and put into solution. After considerable experimentation with various electrolyzing solutions Electromet settled on high carbon ferrochrome which was free from most extraneous elements and a standard product of the company's electric furnace operations.

This enabled standard electric-arc refining operations and the newly devised electrolyte deposition techniques to be combined in one overall process at the Marietta plant to produce electrolytic chromium.

Additional important applications claimed for Electromet's chromium are electrical resistance alloys; nonferrous alloys for metal cutting tools, hard facing materials, and high strength aluminum alloys. The new electrolytic chromium may also be particularly useful in making ductile chromium, which many metallurgists consider the key to development of a new series of high-strength chromium-base alloys.

# RUST-PROOF IRON AND STEEL... FOR YEARS!

ZRC - new protective coating - "cold galvanizes"
Costs 1½¢ per sq. ft. of 100% rust protection

Corrosion your problem? ZRC—new metallic zinc-rich coating—completely protects iron and steel under conditions where all other normally used coatings fail. And ZRC gives this greater protection at lower coverage cost—1½¢ per sq. ft.

ZRC's Record of Results — ZRC painted on gas storage drums in an ocean-side location, withstood corrosive action of salt spray, weather, for 6 months, to date. Ordinary protective coatings failed within 2 months.

**ZRC** sprayed on steel frames used in steam curing treatment of cement block manufacture, kept frames good as new for better than 6 months. Frames

normally broke down and were replaced well within this time period. Net savings — over \$4,000 yearly on replacement costs, using ZRC.

ZRC Easy to Apply — ZRC's unique vehicle prevents settling of metallic zinc — makes spraying possible, requires no repeated stirring while brushing on ZRC. Used either way, ZRC forms a tough, firmly adherent coat — touch dry in 30 minutes, completely hard in 4 hours.

ZRC can be applied directly over adherent rust, mill scale, pitting—prevents further rusting, allows no sideways spread beneath the ZRC coat—no rust "creepage".



#### what is ZRC?

**ZRC** is a zinc-rich coating that protects iron and steel as effectively as hot dip galvanizing or electroplating. **ZRC** contains 93%-95% metallic zinc in a vehicle that prevents settling. A normal coating of **ZRC** deposits ¼ oz. metallic zinc per sq. ft. of surface. It is firmly adherent. **ZRC**'s action is electrolytic and sacrificial. The zinc becomes anodic (A & B, diagram), while the protected iron or steel becomes cathodic, (A¹ & B¹, diagram), in the presence of water vapor. Corrosion attacks at the anode — the zinc layer — forming a film which itself helps retard further corrosion. The cathodic iron or steel is untouched.

#### Full engineering assistance available

Bring your toughest problems to us. The Sealube staff of corrosion specialists is prepared to help you save time, labor, maintenance costs.

#### ZRC SAMPLE

Test ZRC. Sample quantity—enough to cover 8 sq. ft.—is available. Also ZRC information folder. Write Dept. I

CAULKING AND COATING DIVISION

# The SEALUBE Company

WAKEFIELD, MASSACHUSETTS

March 11, 1954

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For layout, inspection, checking, lapping, assembly and welding operations . . . depend on the accuracy and stability of Challenge Precision Equipment. Mail coupon for information on Layout Surface Plates . . . Clamp Edge Layout Plates . . . Reading Tables . . . Lapping Plates . . . Welding Tables . . . Surface Plates . . . Bench Plates . . . Surface Plate Equipment.

#### Challenge Work Benches . . .



two inches thick. Welded steel supports, tool box shelf, steel drawer with lock.



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THE CHALLENGE MACHINERY CO. GRAND HAVEN MICHIGAN

Send details as checked below:

- ☐ Layout Surface Plates ☐ Work Benches
- ☐ Surface Plate Equip. ☐ Utility Bench
- ☐ General Catalog ☐ Welding Tables

Full Address

### **Industrial Briefs**

Still There . . . AMERICAN GEAR MANUFACTURERS ASSN. has not moved its headquarters from Pittsburgh to One Thomas Circle, Washington, yet, as was reported here last week. The move is scheduled for Apr. 1.

Open House . . . MILWAUKEE GEAR CO., 5150 N. Port Washington Road, Milwaukee, held an Open House last week.

Another One . . . H. K. PORTER CO., INC., Pittsburgh, plans to acquire McLain Fire Brick Co., refractories producer with six plants in Pennsylvania and Ohio. The company will operate as a division of Porter with W. A. Turner as vice-president and general manager.

Planned Expansion . . . EASTERN SMELTING & REFINING CO. LTD., Toronto, plans a \$7.5-\$10-million program to include construction of a custom smelter and refinery at Chicoutimi, Quebec.

Attend Classes . . . NATIONAL RADIATOR CO. office employees will attend classes starting early in March and continuing weekly until mid-April in the "NRC College of Heating Knowledge." The course is designed to familiarize Johnstown, Pa., employees with company policies, products and their applications.

New Equipment . . . KROPP ENGINEERED PRODUCTS, Cicero, Ill., subsidiary of Kropp Forge Co., is installing \$1.5 million worth of new equipment which will enable the company to perform all types of machining on both ferrous and nonferrous metals.

"Man of Year" . . . AMERICAN SOCIETY FOR METALS presented A. O. Schaefer, vice-president of Midvale Co., Philadelphia, with an annual award for metallurgical accomplishments. The award named Mr. Schaefer as the Delaware Valley Metals Man of the Year.

Finished . . . ALUMINUM CO. OF AMERICA has completed expansion of its Mobile (Ala.) Works alumina producing facilities. The Mobile Works can now produce sufficient alumina from bauxite for smelting into more than 400,000 tons of aluminum annually.

Leave of Absence . . . KAISER ALUMINUM & CHEMICAL SALES, INC., has granted a leave of absence to R. G. Boyd from his post as assistant general sales manager, so that he may serve as director of the Aluminum-Magnesium Div., Business and Defense Services Administration, U. S. Dept. of Commerce.

Denver Plant . . . AMERICAN CAN CO. will open a new plant in Denver at 46th Ave. and Dahlia St. Construction was started early this month.

Electrode Plant . . . ALLOY RODS CO. formally dedicated its new Pacific Coast Div. manufacturing plant at 750 Lairport St., El Segundo, Calif. last month.

Next Week . . . EAST COAST REGIONAL FOUNDRY CONFER-ENCE will be held at the Benjamin Franklin Hotel, Philadelphia, Mar. 19-20. Theme of the conference in "Economical Foundry Operations."

Gets Plaque . . . REPUBLIC STEEL CORP.'s Cleveland plant of the Pressed Steel Div. was awarded a plaque for having the best safety record last year among the company's 23 manufacturing plants.

Get Their Share . . . Employees of GENERAL ELECTRIC CO., Schenectady, will receive their first checks under the company's savings and stock bonus plan. It is the first return under the plan which GE established late in 1948 whereby employees who buy U. S. Savings Bonds and leave them on deposit for 5 years receive a stock bonus equal to 15 pct of the purchase price of the bonds.

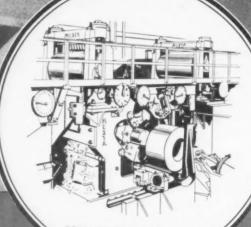
Elected . . . NAT'ONAL WELD-ING SUPPLY ASSN. has elected James N. Alcock, Saginaw Welding Supply Co., Saginaw, Mich. president.

Texas Office . . . FANSTEEL MET-ALLURGICAL CORP. will open a regional sales office on Mar. 15 at 2801 San Jacinto St., Houston, Tex.

Proposed Change . . . AMERICAN CAR & FOUNDRY CO.'s board of directors has proposed changing the company's name to ACF Industries, Inc. A special stockholders-meeting has been set for Apr. 15.

MESTA HOT STRIP MILL

Mesta 80" Four-High Continuous Hot Strip Mill



DOWN COILERS FOR CONTINUOUS HOT STRIP MILLS

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY, Pittsburgh, Pa.

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# Sales Race Demands Heavy Spending

Big Three spends \$5 billion on postwar expansion . . . Borrow to stay with competition . . . Chrysler's Briggs purchase a move to boost efficiency, earnings—By R. D. Raddant.

It takes a terrific amount of money to keep up the pace in the Big Three of the auto industry. Postwar expenditures have run into astronomical figures and improvements still in the works run into the billions.

The terrific financial strain has been pointed up in recent months by the fact that two of the three have had to borrow extensively to maintain the spending pace that is demanded by today's conditions.

Competition Costs . . . General Motors recently sold \$300 million of debentures and only last week Chrysler Corp. went to the Prudential Insurance Co. of America for \$250 million of 100 year notes.

It's logical to ask why these companies that have just enjoyed their greatest financial years are forced to go to outside sources for financial help. The answer is that all of the Big Three are engaged in a heroic struggle for position that can only be met with vast improvements and expenditures.

General Motors in January announced the third billion of a \$3 billion postwar expansion and improvement program. Ford has paid out \$1 billion in the postwar period and has another \$600 million that will be spent before the program is completed. Chrysler has invested more than \$450 million for improvements not including the cost of special tooling involved in model changes.

Money to Modernize . . . Chrysler's own statement explaining the recent loan indicates clearly why it was negotiated. It points out first that plant space has been increased by more than 90 pct and total passenger car and truck capacity by one-third.

"The corporation is continuing to modernize its facilities to take advantage of improvements in production technology. This includes automation, that is, the more extensive use of automatic devices to reduce physical labor, improve accuracy, lessen cost, and increase productivity. The expenditures which have been made and may be made for such purposes, together with the requirements for additional working capital due to the expansion of sales volume over recent years and the return to more competitive conditions make desirable the employment of additional funds in the business." the statement explains.

Need Efficient Plant . . . Chrysler recently purchased Briggs at \$35 million for the manufacturing facilities and will pay an additional amount of about \$27.5 million late this month for its inventories.

#### **GMAC's Income \$7.5 Million**

Annual report of General Motors Acceptance Corp. showed the corporation's 1953 net income after deducting taxes and interest to be \$28,626,359. This compares with the 1952 net income of \$21,062,683.

A cash dividend of \$15 million was paid in 1953 on the Corp.'s capital stock as compared with the previous year's dividend of \$10 million.

Dollar volume of retail receivables purchased during 1953 totaled \$2,795,382,000, an increase of 27 pct over 1952. The corporation's wholesale volume of \$3,902,450,000 receivables purchased showed an increase of 68 pct over the previous year.

The Briggs purchase is a major part of Chrysler's new revitalizing program. But new expenditures will be involved to put it in the efficient operating condition that will make it pay off in the way Chrysler needs. The same goes for many other of Chrysler's facilities. Many of the plants and buildings are antiquated and Chrysler is considering new assembly plants outside of Detroit.

In other words, Chrysler needs the money to buy the facilities that are necessary to cut costs and increase production as it must to hold its market position.

Profit Margin Narrows . . . Although Chrysler Corp. had its greatest auto production in history in 1953, the annual report shows that net earnings dropped from 3.03 pct of sales in 1952 to 2.23 pct in 1953, Its share of the market also dropped in comparison to gains by the other two.

The financial demands of the current market are indicated by the fact that Chrysler has had no long term debt since 1935, when it paid off the last of the \$49,765,000 debt it took over in acquiring Dodge Bros.

Chrysler has recently been nettled by references to the "Big 2½" and appears determined to regain its stature.

Not A Dud... When Nash announced its new All-Weather Eye air conditioning system two weeks ago, it promised its price would be a "bomb shell" to the rest of the industry.

While no visible damage has been noted to the General Motors Building, the price of \$395 must have have jarred some departments. Competitive units sell at \$594 and require a heater at perhaps \$80 more. The Nash All-Weather Eye unit has both heating and air conditioning units combined, the only one in the industry to combine both functions.

The fact that the Nash unit is



the
test-tube
that
paid off
in better
annealing\*

\* Better, more uniform, faster, less expensive annealing. That's a big order. That was what Lee Wilson engineers had in mind when they set out to improve the radiant tube. After months of testing and dozens of designs the new "O" Tube was developed. It was tested by every known method, and has since re-

ceived complete on-the-job testing in many leading steel mills. It's terrific! It promotes rapid combustion, presents a greater heating area. It is compact and efficient beyond expectations. It's the heart of the great new Lee Wilson Single-Stack Portable-Base Annealing System that has been an instant hit with basic metals producers everywhere.

Compact duign of O tube permits complete blanketing of linner covers

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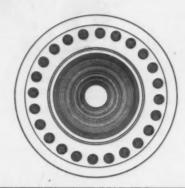
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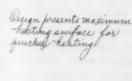
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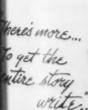
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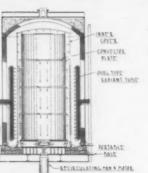


Note how charge receives heat equally from all sides





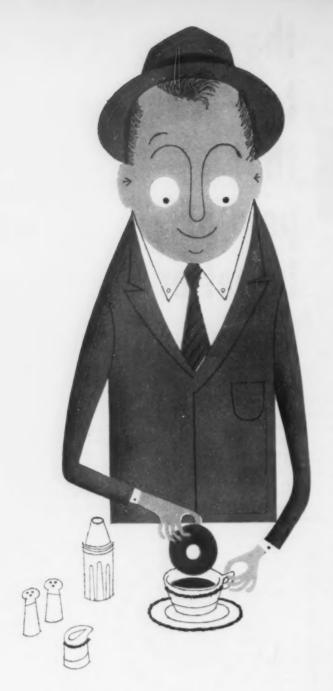




The entire isetion of the tube is limited the furnace. No lost heat

# ENGINEERING COMPANY, Inc.

20005 WEST LAKE ROAD, CLEVELAND 16, OHIO





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You wouldn't think of making a cruller and then punching out a hole to create a doughnut. But for years manufacturers have been taking solid rounds of steel and drilling out the centers to make ring-shaped or hollowed-out metal parts.

Now that wasteful practice is being eliminated. Thousands of metal working plants are using Crucible hollow bars... available in any of Crucible's famous tool steel grades. From Crucible warehouses conveniently located throughout the country you can get immediate delivery of KETOS oil hardening, SANDERSON water hardening, AIRDI 150 high carbon—high chromium, AIRKOOL air hardening, and NU DIE V hot work tool steels in hollow form ... and in a wide range of O.D. and I.D. combinations.

Crucible hollow tool steel bars are supplied machine finished inside and outside... and cut to the length you require. You eliminate drilling, boring and rough facing operations, cut production time, and step up machine capacity when you use Crucible hollow tool steel bars.

CRUCIBLE

first name in special purpose steels

54 years of Fine steelmaking

HOLLOW TOOL STEEL

CRUCIBLE STEEL COMPANY OF AMERICA . TOOL STEEL SALES . SYRACUSE, N. Y.

an integral part of the car makes it difficult to forecast its market-ability for other car manufacturers, although if the Hudson merger goes through it will no doubt be extended to that line. Consensus in Detroit is that cuts will follow among the competition, however.

Diesel Hydra-Matic . . . GMC Truck & Coach Div., which pionered the use of automatic transmissions for the trucking industry, has come up with a Twin Hydra-Matic for use in diesel powered trucks.

Production of this super transmission has been started and will be ready for the assembly lines shortly. It will be placed first on a heavy cab-over-engine tractor rated at a gross weight of 60,000 lb and will be available later in other 150-hp models. Eventually, it will be engineered for use in diesel engines in the 175 to 225 hp range.

The Twin Hydra-Matic consists of an upper and lower unit mounted one over the other and governed to shift alternately with each other through seven forward speeds and one reverse. The units are geared together at the rear, driving a single output shaft connecting with a 3-speed reduction unit

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# Ford's gas turbine research is auto industry mystery.

One of the big mysteries in Detroit is what Ford is doing in the development of gas turbine engines for automobiles.

It is no secret, in fact Ford advertises publicly, that it is working hard on gas turbines. Recently the gas turbine test laboratory at the Ford Research & Engineering Center was completed and even more recently Ford engineers reported on metal stretch tests that were frankly aimed at testing potential materials for key gas turbine engine parts.

To date, however, GM's Firebird

is the only operating gas-turbinepowered car and this was developed more as a styling gimmick for the Motorama and other auto shows than as an experiment in gas turbine power.

Best information from GM, unofficial or otherwise, is that the gas turbine's big potential is in the commercial field on heavy trucks or buses. Ford has no product in this field, which adds to the mystery of the intensive activity. Ford is not known to have any operating gas-turbine-powered vehicle while GM has one show car and at least one other vehicle.

#### Detroit Notebook . . .

Auto executives don't talk about it too much publicly, but they are subtly assuring stockholders that due to the lifting of the excess profits tax, earnings will be substantially greater per share in 1954 even with less volume of sales.

¶ Latest of the so-called dream cars is Ford's FX-Atmos, which will make its first appearance at the Chicago auto show Mar. 13-21.

#### **Automotive Production**

(U. S. and Canada Combined)

WEEK ENDING CARS TRUCKS
Mar. 6, 1954... 115,483\* 22,964\*
Feb. 27, 1954... 122,222 23,758
Mar. 7, 1953... 128,511 30,314
Feb. 28, 1953... 136,901 30,878
\*Estimated. Source: Ward's Reports

It has a front luggage compartment, transparent top, and twin tail fins. It is not a production car, is more a style experiment.

¶ Automobile Manufacturers Assn. has recommended standard muffler designs for truck makers to establish maximum permissible noise levels and an agreed method for measuring exhaust noise. AMA's Motor Truck Committee points out that manufacturers have made significant advances in muffler design in recent years, but believes that adoptions of standards will stimulate results. ¶ Scrappage of passenger cars was lower in 1953 than for the past 2 years, which is possibly a contributing factor to the gener-

ally disappointing auto sales.

THE BULL OF THE WOODS

By J. R. Williams





The reasons may be found in Heppenstall's high standard for the development and manufacture of shear knives. Made from high quality, electric induction steels, the long-lasting knives are famous wherever hot and cold ferrous and non-ferrous metals are cut and sheared.

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Make Heppenstall your standard specifications.



# Heppenstall

The most dependable name in forgings
PITTSBURGH 1, PENNSYLVANIA

Sales offices in principal cities

## Consumer Will Get The Tax Breaks

Congress writing new tax laws to give public more spending money... Try for bigger exemptions, lower excises... Cut in corporate rate not likely this year—By G. H. Baker.

This year's tax legislation is now clearly destined to give the biggest break to the consumer. The pattern of future tax rates now taking shape at the Capitol indicates that Congress intends to place considerably more spending power in the hands of the buying public.

For individual taxpayers, exemptions are to be increased, possibly by as much as \$200 per person.

Boost Consumer Buying ... For retail purchasers, excises are to be trimmed by a total of \$1 billion. This means an extra \$1 billion to be spent in retail market places.

In contrast, the corporation rate looks like it will stay at 52 pct for another year.

Political strategy behind the coming reductions: Higher exemptions for individuals plus lower retail excises should produce a chain reaction of consumer buying that will shrink swollen inventories, provide jobs, and renew public confidence.

For a look at the new tax levels, as approved thus far in the House, see chart.

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Ask Higher Wage ... New pressure for raising the national minimum wage is being felt at U.S. Labor Dept. A conference of state labor officials and union officers is urging Labor Secretary Mitchell to increase the present 75¢ minimum to \$1.25 per hour as soon as possible.

As a matter of practical politics, it is doubtful if Congress will act this year to increase the 75¢ figure. A number of firms cannot afford an increase in these times of fewer orders and a reduced sales volume.

Their only alternative would be to lay off employees in order to keep payroll costs down. As a result, Congress is inclined to omit, for the balance of this year, any lifting of the present 75¢ ceiling.

Revise Renegotiation Law . . . Look for congressional approval of a new renegotiation law before

#### When Tax Rates Change

For the retail and manufacturers' taxes and safe-deposit boxes the new tax rates are to apply to transactions on or after Apr. 1, 1954. However, in the case of leases, installment sales, conditional sales, or chattel mortgage installment arrangements, entered into before Apr. 1, 1954, payments after Apr. 1, are subject to the new rates.

For admissions, the new tax rates apply to amounts paid on or after Apr. 1, 1954, for admissions on or after that date. For dues, the new tax rates apply for amounts paid on or after Apr. 1 as dues or membership fees for periods beginning Apr. 1.

New communications tax rates will apply with respect to amounts paid pursuant to bills rendered on and after Apr. 1, 1954, for services rendered on and after such date, and for any unbilled services rendered in February and March.

July. Broad outline of the new law has not yet been determined within Congress, but the White House is putting the pressure on the Senate to approve some form of renegotiation law that will take up where the old law left off last Dec. 31. The Senate has not yet

Turn Page

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0.1	Furs	10%	20%
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	Toilet Prep.	10%	20%
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1 Admis	sions & Dues	lé for	146
	Aumistions.	Zacronomona	1¢ for 5¢
10000	Lease of Seats	10%	20%
	Ticket Brokers	10%	20%
9	Cabaret Tax	10%	20%
1	Club Dues	10%	20%
2 Comm	nunications		
	Long Distance Calls	10%	25%
	Local Phone	10%	15%
	Telegrams	10%	15%
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MANUF	ACTURER'S EXCI	SE TA	XES
14.7	Lighters	10%	15%
L(8)	Light Bulbs	10%	20%
01	Firearms, Shells	10%	11%
	Pens, Pencils	10%	15%
10 E	Photograph App.	10%	20%
700	Sport Goods	10%	15%
MISCELL	ANEOUS EXCISE	S	
	Safe Deposit Boxes	10%	20%
Apr. 1, unchang	scheduled for rebut now continued ped reduced rates not effective under Bill OLIC BEVERAGES	resent Re	
U	Distilled Spirits	\$10.50	
534	Beer per bbl.	SECTION STATES	\$8.
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CIGARE		% lower	7¢
	ACTURER'S EXCI		
MANUE	Passenger Cars	10%	7%
MANUF			
MANUF		19.4	57
MANUF	Trucks, Buses	8%	5%
MANUF	Trucks, Buses Auto Parts	8%	5%
	Trucks, Buses		

# GEARS SHAVED in 12 to 20 SECONDS

Finishing precision gears to close tolerances on tooth profile, index, eccentricity and tooth surface smoothness on Red Ring Shaving Machines is a high production operation as indicated by these random examples.



A SHAVING TIME 16 SECONDS



B SHAVING TIME 16 SECONDS



C SHAVING TIME 20 SECONDS



D SNAVING TIME 12 SECONDS



E SHAVING TIME 15 SECONDS



F SHAVING TIME 20 SECONDS

#### GEAR CHARACTERISTICS

WRITE FOR DESCRIPTIVE
LITERATURE ON
Red Ring
Gear Shaving



Gear	Stock Removed Over Pins	Material	No. of Teeth	PD	DP	Face Width	
A	.010"	Steel	19	2.4"	9.25	5/8"	
B	.010″	Steel	29	4.00	9.25	11/16"	
G	.010″	Cast Iron	28	25/6"	10	11/4"	
D	.005"	Steel	12	11/8"	13.5	1"	
0	.006"	Steel	14	2%"	6/8	11/16	
G	.012"	Aluminum	54	57/8"	10	¾"	

NATIONAL BROACH & MACHINE CO.

5600 ST. JEAN . . . . . . . . . . . DETROIT 13. MICHIGAN

WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

Trouble is brewing over two amendments—one to increase the dollar volume of defense contracts exempt from renegotiation, the other exempting standard commercial articles. The White House won't permit Congress to adjourn without enacting some sort of renegotiation bill, even if it means a long, drawn-out fight on the subject.

### Census:

# Weeks to ask pulse-checking funds for business, mining.

While there's nothing definite now, the outlook is brighter for funds with which the U. S. Census Bureau could carry out a delayed census of business, manufactures, and mining. Secretary of Commerce Sinclair Weeks is ready to ask Congress for around \$8 million in supplemental funds for this purpose.

Last year, the Truman budget sought \$22 million; Eisenhower budgeteers trimmed it to about \$13 million. Congress threw out the project altogether.

This year a House committee turned thumbs down on a proposal to spend \$3.5 million on a sample census of agriculture, and proposals for spot checks of business have been trimmed sharply.

However, some members have indicated a willingness to go along with a reasonable appropriation for a business census, provided Commerce Dept. could show it is needed

Secretary Weeks will be armed with two types of ammunition, both calculated to impress Congress.

First, he has the report and recommendations of a nine-man review committee, headed by Ralph J. Watkins, research director for Dun & Bradstreet, Inc., and composed of top economic experts.

Specifically, it was recommended that a complete census of manufactures and mineral production be taken in 1955 and every 5 years thereafter together with the wholesale, retail, and service trades.

Only the government can take such a census, the unanimously approved report says, and the lack of up-to-date information seriously handicaps the economy.

Secondly, Secretary Weeks intends to show Congress that the census can be carried out without affecting his department's overall budget.

Process is simple, if Congress will only grant the \$8 million with authorization for such use. Mr. Weeks would merely chop away until his already tight budget has saved an equivalent amount.

He must have the authorization. He can't do it on his own.

#### Labs Get New Writeoff Standard

Recognition of the importance of research and development work has been accorded through expansion of the base by which new laboratories are granted federal tax amortization certificates.

Under revised goals and standards, such laboratories will be eligible if they are being established in connection with an industry product or service which itself is under an expansion goal.

Formerly laboratory eligibility was confined to those holding defense contracts with the government, and only if expansion were



LABOR SECRETARY James Mitchell (right) talks with newly appointed Assistant Secretary of Labor J. Ernest Wilkins.

necessary to complete the contract.

But the new goal does not include control laboratories—those necessary to obtain a uniform or standard production, even though the plant itself holds or is eligible for a fast tax writeoff certificate.

### Noise:

# Navy studying effect of high intensity sound on personnel.

The Navy is training its guns on a new enemy—noise. Office of Naval Research has told THE IRON AGE it is greatly interested in effects of high intensity noise on operational performances of its personnel. ONR is keeping an eye on a study which Navy Bureau of Medicine & Surgery is doing on noise problems.

It also hopes to get data from non-Navy studies being carried out by Committee on Noise in Industry of the American Academy of Ophthalmology and Otolaryngology, in Los Angeles.

In the February issue of Research Reviews, an ONR publication, Capt. Clifford Phoebus wrote that Bureau of Medicine is eager to get "reports and comments from observers in the field" on the high intensity noise subject in general and on "extra-auditory phenomena" in particular. Highlights of the article by Capt. Phoebus, who is a special assistant for biological sciences at ONR, include:

- 1. Flight surgeons on aircraft carriers are especially concerned with the noise problem and steps needed to safeguard men aboard from the hazards created by noise.
- 2. First real action toward defining the noise problem was taken in spring of 1952 aboard the carrier Coral Sea. Research team found "topside" personnel were already suffering auditory damage. The team also found there is no easy solution to this problem.
- 3. Guided missiles, even noisier than jets, are going to make the noise problem even tougher, and no adequate solution may be reached for some time.

AGE

# WE GET BROACHING SERVICE"

by Master Mechanic
Leading Automotive Parts Maker

We have been relying on Colonial Broach Company for all phases of broaching—engineering, manufacturing, and service—for over 25 years.

Several of our Colonial 10-ton pull-ups and horizontals have been in continuous use, at times on a three shift basis, since 1936, broaching gears, splines, etc., for tractor and automotive transmissions. Today, over 80% of the broaching machines in our shop, on both internal and surface broaching operations, are Colonials.

Engineering cooperation on fixture design from Colonial is the best. We get exactly what we require for both internal and surface broaching applications, and we get it promptly.

Colonial supplies the greatest percentage of our broaches.

Design, accuracy, broach life, and resharpening service are all that we could ask. In all our 25 years of dealings, Colonial has never failed us when we had to have something in a hurry

BROACHES

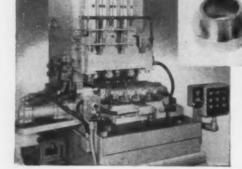
Unified Broaching

2-STEP BROACHING — 280 GEARS per hr.

Four tangs on 280 automotive oil pump drive gears per hour are broached in two steps on a Colonial RS-10-54 single ram broaching machine. Tangs are 0.345" x 0.431".

Four parts are broached on one side of a 180° indexing shuttle fixture, while broached parts are unloaded from outside stations, semi-finished parts are moved from inner to outer stations, and blanks mounted on inner stations. Fixture recedes, indexes 180° as broach returns, then advances to broaching position, and cycle is repeated.

This is a Colonial Unified Broaching Installation



#### **KO'd Machine Shops Going on Block**

Many machine shops set up to do war work now find tough going... Close outs are keeping auctioneers busy... Southern California hit hardest—By T. M. Rohan.

A healthy slice of the defenseboom machine shops which sprang up in California during World War II boom are now getting ready to throw in the towel.

A major Los Angeles machinery auctioneer said last week, "There are at least 250 small plants in Southern California for sale at reasonable prices. At least a dozen will be auctioned by us in the next few months.

"Most of these firms made their money when prices were high and production rushed. Many have been mismanaged or just can't compete in a normal market. But our volume of auctions is still not as high as in pre-Korea days, so business is not as bad as many think."

What's Behind It? . . . Among the reasons for the plant sales are government contract stretchouts, reductions in subcontracting, highly competitive bidding and high overhead. Some embittered operators also blame incessant government design and production changes.

Southern California with its myriad of small machine shops which were formed after World War II is the area reporting the most closeouts. Northern California and the Pacific Northwest are more stable.

Larry Guest of Milton J. Wershow Co., Los Angeles auctioneers, last week said his firm expects business to be at least 50 pct over its \$3.8 million volume average.

Government Unloads ... Unloading of many government machine tools which have been in storage will be responsible for heavy volume and bargains for users. In

May, \$11 million worth of Navy compressors, welders, machine tools, spare parts, road graders, and other items will go on the block at Port Hueneme, 80 miles north of Los Angeles.

Another \$5 million is scheduled for auction at the Army's Lathrop reconsignment depot at Stockton, Calif.

In the civilian field about \$1 million worth of oil tools and well equipment will be sold at former Luscomb Aircraft plant, now Engineering Laboratories, Tulsa, Okla.

Prices being paid for machinery at auctions are very low compared to 6 months ago.

"Average" Sale . . . At a sale last week at Vagim Machine & Engi-



LARGE BEER! Ten-ton, 16x30 ft stainless steel beer tank is being installed at Hamm Brewery, San Francisco.

neering Co., Fresno, Calif., machinery assessed at \$151,000 brought \$50,000, "about average these days," according to Pres. Edw. J. Vagim. About 250 people attended the sale, including 50-60 big money buyers.

A year-old set of \$2000 Diamond drills went for \$500; a 20-in. Axelson lathe with \$14,000 replacement value went for \$10,000; a year-old \$6500 Do-All grinder brought \$3600; a 1945 Monarch lathe costing \$12,000 went for \$6000 and a set of four punch presses up to 75-tons capacity, costing \$19,000, went for \$11,000. A year-old 1½-in. hollow spindle Logan lathe costing \$2000 with all tooling went for \$500.

\$40,000 Loss... Mr. Vagim, who also runs a food processing plant, estimates he lost about \$40,000 in personal assets since beginning production of spare parts for guns and gun mounts in 1950 on a \$175,000 contract.

He attributes the loss to extensive design changes, wasted engineering work, and "hold" orders. An investigation is to be made at his request by the Senate Committee on Small Business in connection with closing out the contract, he added.

In a Washington appearance, he advised provision be made for government contractors for business interruption insurance "and whatever it cost, it would be cheap."

Western Steel Notes... Pacific States Steel Co. at Niles, Calif., goes back in production this week after a 2-week shutdown due to drive-motor failure on its 26-in. bar and structural mill.

A half-day wildcat strike of rolling mill employees at U. S. Steel's Pittsburg, Calif., mill caused some loss in production there last week. All openhearths at the firm's Torrance, Calif., plant were shut down for a month for furnace repairs and installation of new charging buggies.

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## Experience Cannot be Copied

More than a quarter-century ago MARVEL invented and basically patented the MARVEL High-Speed-Edge Hack Saw Blade—the UNBREAKABLE blade that increased hack sawing efficiency manyfold.

Every MARVEL Hack Saw Blade ever sold has been of that basic welded high-speed-edge construction, with constant improvements from year to year, as EXPERIENCE augmented the "know-how"...

MARVEL is not "tied" to any single source of steel supply, and has always used the best high speed steels that became available from time to time as metallurgy progressed. When-as-and-if finer steels are developed—and are proven commercially practical for welded-edge hack saw blades—MARVEL will use them, regardless of cost or source . . .

There is only one genuine MARVEL High-Speed-Edge! All other "composite" or "welded-edge" hack saw blades are merely flattering attempts to imitate without the "know-how" of MARVEL EXPERIENCE . . .

Insist upon genuine MARVEL High-Speed-Edge when buying hack saw blades—and be SAFE, for you can depend upon MARVEL. They have been "tested", "pre-tested", and "re-tested" by thousands of users for more than a quarter-century!



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#### **Push Fight on Non-Defense Leasing**

NMTBA says government-owned machine tools have been leased for civilian production "in a number of cases" . . . Fears depressed market, loss of defense reserves—By E. J. Egan, Jr.

The government not only owns a lot of butter and wheat, it also has a lot of modern, slightly used machine tools. The exact number isn't known, but various estimates indicate the U. S. holds title to about one out of every five production machine tools in the country.

These tools were bought to make armaments during the Korean war. With defense needs now less pressing, thousands of the Defense Dept.'s machine tools are idle or soon will be.

Not Sold by Pound . . . Office of Defense Mobilization knew that a lot of civilian manufacturers would be looking for machine tool bargains such as were available after World War II. But this time there were to be no bargains. Instead, idle tools would go into a national defense reserve. In case of another emergency, the tools would be ready to go into production immediately.

Last October ODM served notice on bargain hunters and those who just wanted to "rent some tools and take good care of them." Order VII-4 stated: "Dept. of Defense-owned tools and equipment shall not be leased for non-defense production except when plans for leasing have been submitted by the Dept. of Defense and approved by the Office of Defense Mobilization."

But the "except" clause in Order VII-4 bothered U. S. machine tool builders who spotted it as a potential "escape" clause. And a recent bulletin issued by the National Machine Tool Builders' Assn. claims that government-owned machine tools have been leased to producers of civilian goods in "a number of cases."

Scuttle Reserve . . . NMTBA fears government leasing would hurt the industry and also believes that if tools are leased for civilian production there will no longer be a reserve. Mere government ownership would not guarantee that the tools would be readily available and in good working order should another emergency arise.

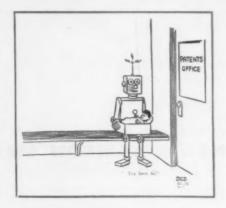
NMTBA backs up its reasoning with several arguments:

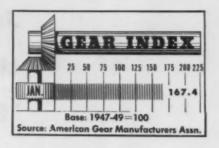
(1) Many machine tools are now in production lines or groupings for certain types of production. Leasing individual machines would break up these combinations, making production impossible until they could be reassembled.

(2) Machine tools would not be properly cared for under leasing agreements, would soon lose their accuracy, possibly various essential attachments as well.

(3) Such leasing would involve a huge amount of paperwork and confusion.

Leasing Was Limited . . . Defense Dept. counters NMTBA claims by saying there have been only three non-defense leasing arrangements since ODM Order





VII-4 was issued. One allowed Brunswick Ordnance (a subsidiary of Mack Truck) to use 116 tools out of a 540-tool defense line to make Ford transmission parts. Ford promised to release the tools by June of this year when its own tools were delivered and installed.

The other two leases involved only one or two tools each, according to Defense Dept. information.

Test Case Coming . . . A major test case on tool-leasing for civilian production is up for decision, but is dormant at the moment. Case involves Brown & Root Co., Inc., former operators of a defense plant at Houston. The firm wants to lease some of the tools it operated for the government. It wouldn't move them from Houston but would definitely use them for civilian production.

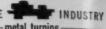
Builders are watching this case very closely. If the decision is against the Brown & Root petition, machine tool manufacturers will breathe easier. If the decision favors the leasing deal, they believe there may be a swarm of similar applications.

While the haggling goes on, it looks like the government will keep buying new machine tools. Charles F. Honeywell, Business and Defense Services Administration chief. predicted Defense Dept. would order \$250 million in machine tool products this year.

He told an American Machine Tool Distributors' Assn. meeting at Boca Raton, Fla., last week government spending should push industry sales to \$944 million in 1954. Previous industry estimates ranged from \$700 to \$900 million.

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AGE



# Jones & Lamson tells the story of its "Production Studies" Seminars

Since World War II, J&L has been intensively researching the hows, whys and wherefores of High Velocity Turning. In the course of making more than 12,000 advanced experiments in metal turning, we've learned a great deal. The importance of our findings demanded that they be shared with all of industry.

To do this effectively, J&L instituted a program of "Production Studies" Seminars. At these Seminars, held periodically in Springfield, Vt., J&L plays host to small groups of the nation's top production men. These visitors, in two days of chalk talks, movies and production-line demonstrations, get the facts on High Velocity Turning. Back at their own plants, this knowledge helps them to improve quality, boost production and cut costs.

At regular intervals in these pages, J&L will present specific case histories that show how J&L Research is paying off for industry.

"... actual production experience with our new High Velocity data, tools and techniques proves beyond a doubt that metal-cutting efficiency can be increased anywhere from 30% to 300%, often with existing machines."

James C. Hebert General Sales Mgr. Jones & Lamson Machine Co.





Investigate what J&L Research can do for your production.

#### JONES & LAMSON MACHINE COMPANY



511 CLINTON ST., SPRINGFIELD, VERMONT, U. S. A. • FAY AUTOMATIC LATHES TURRET LATHES • THREAD GRINDERS • OPTICAL COMPARATORS • THREADING DIES

M

#### REPORT TO MANAGEMENT ...

\$2 billion hole in pocket Business and industry lost \$2 billion last week. That's the amount firms would have saved if the automatic corporation tax reduction scheduled for Apr. 1 hadn't been thumbed down by the House Ways & Means Committee.

There's little doubt Congress will approve the committee's recommendation to keep corporate taxes at current levels.

Business leaders, however, are not expected to paper Congress with wires demanding the tax reduction. Prospects for the tax cut have been deepfreezed since the President outlined his economic policy-weren't thawed by Democratic charges that the Administration is pushing a "trickle down tax program."

Blunt ike's needle While following Administration prodding on corporate taxes, the House Ways & Means Committee hedged on the President's request that there be no excise tax cuts. Committee passed a bill holding the excise tax line on autos, trucks, automotive parts, liquor and tobacco, slashed to 10 pct excises most other items.

Approval by Congress of this proposal also seems certain. Result will be a slight increase in consumer buying power, increased sales for industries affected by the cut, a loss of nearly \$1 billion in revenue for the Treasury Dept.

Give and take —mostly give

Box score of yearly revenue lost on tax cuts made, or certain to be made, since January reads like this: Excess profits, \$2 billion; personal income taxes, \$3 billion; excise taxes, \$1 billion. Total loss \$6 billion. Treasury held its own on: excise taxes not cut (auto, liquor, tobacco) \$1.1 billion; extension of corporation taxes, \$2 billion. Unestimated as yet is the revenue loss that would result from proposed changes in dividend, depreciation tax policies.

And still to come is the expected battle on increased personal income tax exemptions being championed by the Democrats. If this tax cut were approved, revenue loss would be \$5 billion the first year, \$10 billion the next.

Help economy cross the street

There's still a lot of bad news on the overall economy but if you're interested in the plus side: Machine tool sales this year are expected to top \$1 billion, compared with last year's \$862 million; new order index of industrial supplies and machinery was up in January for the first time in 4 months; sales of small appliances are equalling, topping last year's; carmakers see signs of a vigorous spring sales upturn.

· · · when farm vote comes in

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AGE

For the writer of the forthcoming B'way show tune, "How Ya Gonna Keep 'Em Down on the Farm After They've Seen the Farm": Farmers are surprisingly optimistic for a group that has been hard hit by price dips.

Surveyed recently on how they regard the agricultural outlook now as compared with 6 months ago, 26 pct said it was more favorable; 20 pct, less favorable; 44 pct "wait and see".

March 11, 1954

#### COPPERWELD STEEL COMPANY

WARREN, OHIO



#### INTERIOR CORRESPONDENCE

FROM E. W. Husemann Assistant Chief Metallurgist

SUBJECT Steel Alloy Leaded

DATE March 3, 1954

W. J. Buechling Chief Metallurgist

Here is another report on the comparitive machining qualities of leaded alloy Here is another report on the comparitive machining qualities of leaded alloy and carbon steel. The story bears out the excellent results experienced by another manufacturer—faster machining—longer tool life—superior finish. One special advantage for automatic screw machine production, however, highlighted another tabulation below to the limited number of machining. Dear Bill: special advantage for automatic screw machine production, nowever, nightighted in the tabulation below, is the limited number of regrinds--even on the cutoff operation.

Material - 4150 Leaded Alloy 1-7/16" Rd. Spindle Speed 435 RPM

Cycle - 102 Sec. Part - 12 Pt. Socket Total pieces run - 750

	Feed Rev.	lst Regrind	2nd Regrind	3rd Orind	4th Grind	5th Grind	6th Grind	Total Regrind
cool	.0016"	450 pcs		-	-	-		0 1
Form Tool Comb Drill	.008"	-	-	-	+	1		0
3/4" Drill	.006"	-	+-	+	+			0
Recessing Tool	.002 H	+	+-	+			-	0
Counter Bore	.012"		1	1			-	0
Knurling Tool			220					2
Cutoff Tool	.0024	1 450						

Material AISI 4150 1-7/16" Rd. Spindle Speed - 290 RPM

Cycle - 142 Sec. Part - 12 Pt. Socket Total pieces run - 1000

		lst	2nd	210	4th Grind	5th Grind	6th Grind	Regrind
	Feed Rev.	Regrind	Regrind	Grind	OI ZII			3_
001	.0016"	190 pcs	320 pc	200 pc		-		3
Form Tool		250	90	400	-	-	1	1
Comb Drill	.008 <sup>n</sup>		210	324	300	-	+	+
3/4" Drill	.006 H	40		l and in	Holder)	1_	1	1-
Recessing Tool	.002"	83*	Tool S	lipped in				0
Counter Bore	.012"	-	-	+	1			0
Knurling Tool	.006"	-	-	1 000	70	107	200	6
Cutoff Tool	.0024	40	169	propert:		d. tens	ile, and	ducti-

It is important to note that mechanical properties, yield, tensile, and ducti-Ed lity, more than met specifications.



The problem of modernizing with limited funds was solved easily by executives of one prominent steel plant. They found that a single Bliss mill could replace two old special-purpose mills. By choosing a Bliss combination mill-designed for both cold reduction and temper pass work-they achieved advantages, not otherwise available, without a larger capital investment. These include:

- Greater reductions, higher speeds, finer tolerances
- Conservation of valuable floor space
- Manpower savings with single operating crew
- Minimum idle mill time

Bliss designed this versatile combination mill in order that changeover from cold reduction to temper rolling could be made quickly and easily. Special entry guides, tension bridle and other accessory equipment are supplied for this purpose, in the production of tin-plate as well as sheet stock.

If you, too, are interested in low cost mill modernization, consult Bliss. Meanwhile, write for your copy of the New 60-page Bliss Rolling Mill Brochure. Recently revised, it describes many modernization alternatives. Ask for Bulletin 40-A.

Remember: BLISS for Presses, ROLLING MILLS, Special Machinery

E. W. Bliss Company . General Office: Canton, Onio ROLLING MILL DIVISION: SALEM, OHIO

Subsidiary: The Die Supply Company, Cleveland, O. . E. W. Bliss (England) Ltd. . E. W. Bliss Company (Paris) France

#### PERFECT WELDS

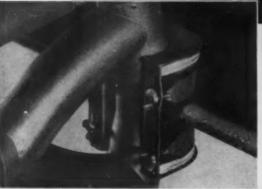
99 TIMES OUT OF 100

#### Rejects on the same job were

A large west coast manufacturer of welded steel pipe installed Vacu-Blast edge cleaning to eliminate seam leakage. Every length of pipe was pressure tested. Even with this stringent requirement, less than 1% of the welds were rejected after Vacu-Blast was installed.

formerly 20 to 25%





#### DUSTFREE CLEANLINESS PAYS OFF

Critical welds are perfect because Vacu-Blast gives unexcelled precleaning. Rust, scale and dirt are completely removed regardless of the original condition of the steel surface. In addition, Vacu-Blast's unique vacuum return carries off all the abrasive and dust.

#### VACU-BLAST ADAPTS TO EITHER MANUAL OR AUTOMATIC WELDING

Vacu-Blast can be used either manually or as a built-in installation on automatic welding. It is used successfully on edge thicknesses from 28 gauge sheet to 2-inch thick plate or shapes. Vacu-Blast double guns clean top, bottom and edge simultaneously.

#### HOW THE VACU-BLASTER WORKS

A stream of steel grit blast cleans the surface with great thoroughness. A vacuum return sends the abrasive, dust and dirt back to the blast generator. The gun's surrounding bristles keep dirt and abrasive from scattering about your plant. All abrasive is continuously reclaimed for reuse time and again.



#### VACU-BLAST CO.INC.

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#### Welding

Stranded Electrode Materials for Aircomatic Welding is the title of new 12-p. reprint being offered by Air Reduction Sales Co. Article discusses the use of stranded wires in the inertgas-shielded metal-arc consumable electrode Aircomatic welding process. Air Reduction Sales Co.

For free copy circle No. 16 on postcard, p. 107.

#### **Rolling mills**

E. W. Bliss Co. has revised and expanded its brochure of Rolling Mills and Accessory Equipment. New 60-p. brochure contains a variety of installation photographs and descriptive data on Bliss mill equipment for steel, brass and aluminum industries. Also included is 16-p. section containing engineering tables and charts of value to engineers in the metal-producing industries. Rolling Mill Div., E. W. Bliss Co.

For free copy circle No. 17 on postcard, p. 107.

#### Motors

Bulletin is now available on Allis-Chalmers totally enclosed, fan-cooled motors. Illustrations, dimensions and hp-frame chart are included. Allis-Chalmers.

For free copy circle No. 18 on postcard, p. 167.

#### Precipitator

Illustrated 20-p. booklet describing the many applications, principles of operation, design features, advantages, recommendations, flow diagrams, and specifications of Permutit Precipitator in its three basic designs has been released. Permutit Co.

For free copy circle No. 19 on postcard, p. 107.

#### Time delay relay

New two-step Agastat pneumaticallycontrolled time delay relay is described in new bulletin. Elastic Stop Nut Corp. of Americe.

For free copy circle No. 20 on postcard, p. 167.

#### Carbide dies

Latest information on standard cemented carbide die specifications and prices is included in new bulletin released by Carboloy. Publication lists round hole dies, rough cored and finished, braze-type rough mandrel nibs, finished tube-drawing mandrels, square and hexagon shape dies, nail gripper and header die nibs, guide rings and wire guide bushings. Carboloy, Dept. of General Electric.

For free copy circle No. 21 on postcard, p. 107.

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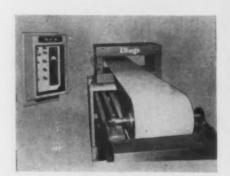
Coil Spring Div.

GARDENA, CALIF.

IN CANADA - The WALLACE BARNES CO., Ltd., Hamilton, Ontario

## EQUIPMENT

New and improved production ideas, equipment. services and methods described here offer production economies . . . just fill in and mail the postcard on page 107 or 108

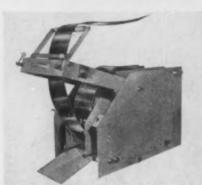


#### Electronic metal detector has ultra sensitivity

The new Dings electronic detector is sensitive to all metals, ferrous or nonferrous, and is said to detect even minute metal particles, signaling their presence, and thereby protecting machinery and product quality against tramp metal damage. A wide range of signal and reject system arrangements is available for

use with the instrument, to provide automatic detection, with manual. semi-automatic or fully-automatic rejection of tramp metal. They are built in two basic types for general industrial service and for deep burden service such as mining. Dings Electronics, Inc.

For more data circle No. 22 on postcard, p. 107.



#### Coil cradle eliminates slippage or binding

New coil cradle design embodies the use of power driven pinch rolls to uncoil the stock, much the same as a roll feed on a power press. The rolls are spring loaded and thus eliminate all slippage of heavy gage stock. Material up to 18 in. thick can be fed to the press automatically. Hard, tempered, kinked or rough coil stock does not impair efficiency. The hazards of binding

heavy metals is eliminated: it simply rolls it into the cradle. Since there is a slack loop to the die or feed, there is no drag, and if the press is hand operated it eliminates operator fatigue. The cradle accommodates coils up to 40 in. maximum diam, 12 in.-wide stock, and 2400 lb coil weight. Uncoiling speeds range to 100 rpm. Wm. Halpern & Co., Inc.

For more data circle No. 23 on pastcard, p. 161.



#### Armor makes bumper doors almost indestructible

Built to withstand the splintering, pounding, gouging abuse to which factory access doors are subjected by fork lift trucks and other industrial equipment, the new Ace Dura-Dor is rigid, strong lightweight plywood reinforced with steel and completely covered with a tough hide of soft rubber. DuraDor is practically indestructible. Hinges are located so that impact on the bottom of the door is dynamically counteracted. The new door requires almost no yearly maintenance. American Hard Rubber Co. For more data circle No. 24 on postcard, p. 101.



#### Deburrs both sides of holes simultaneously

Burrs are removed from both sides of holes at the rate of 600 to 3000 holes per hour with this semi-automatic deburring machine. Using standard countersink type deburring tools, the spindles rotate in opposite directions giving an equalized cutting action. Capacity of the machine is 6 in. between chucks and will take up to a 1-in. diam hole. Workholding fixtures are not necessary as operator merely inserts part, depresses foot control valve pedal and the machine automatically deburrs both sides of the hole simultaneously. Setup time is reduced to a minimum as machine can be changed from one workpiece to another within 3 min, making it possible to be used profitably on production as low as 25 pieces. Model Machine Co.

For more data circle No. 25 on postcard, p. 18%. Turn Page

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LISTS ONE OF THE LARGEST STOCKS of all kinds of steel in the United States--ready for quick delivery.

INVALUABLE FOR ESTIMATING your regular and special steel requirement costs--accurately.

CONTAINS LATEST TECHNICAL data on new steels--leaded steels. leaded alloys, etc.

INCORPORATES TIME-SAVING reference information on selecting the right steel.

INCLUDES SPECIAL CHARTS to compute physical properties, machinability.

If you order steel-it will certainly pay you in more ways than one to have a copy of the new A. M. Castle & Co. Stock Book. And, it is yours for the asking. But the supply is limited, so mail the coupon-TODAY. No obligation.

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#### Shell molding machine offers full flexibility

Pattern changing on this multiple station shell molding machine is accomplished in less than 1 min. Independent heat control and curing time control for each pattern provide flexibility that will permit the shell molding of many jobs never before within range of this

process. The Shellformatic illustrated accommodates three 24x30 in. patterns and delivers a finished shell every 30 sec. With second furnace the production is doubled. Units are single and multiple pattern types. Beardsley & Piper.

For more data circle No. 26 on postcard, p. 107,



#### Platen grinder provides fastest cutting action

A German made horizontal platen grinder which has both platen and contact roll, is equipped with a serrated rubber contact belt running between the platen and the abrasive belt. This is said to provide flat grinding with amazing cutting action. The rubber serrated contact belt also minimizes glazing or loading of the abrasive belt with its

high speed impact action. This innovation permits platen grinding with fine grit coated abrasive belts maintaining fast cutting action with resulting fine finishes. A two-speed motor develops belt speeds of 5000 and 12,000 sfpm. Top speed permits fast, substantial stock removal. Curtis Machine Corp.

For more data circle No. 27 on postcard, p. 101.



#### Low temperature chambers for cold treatment

Sub-Artic chambers for cold-treating metals include models producing temperatures to — 170 F. The units are equipped with rotary compressors designed for use with the latest Freon refrigerants. Work spaces range from 1 to 12 cu ft. Chambers in all models produce temperatures to — 40, — 80, — 100

and — 120 F. Typical metal-treating applications are quick-aging, stabilizing, stress equalization, shrink-fitting, hardening, and super-hardening of tool steels. Heat dissipation ratings permit removing heat from mass loads. Tenney Engineering, Inc.

For more data circle No. 28 on postcard, p. 101.



#### Handling device lowers shipping costs

Called the Tow-Loader, a handling device makes it possible to use thin pallet sheets in place of the conventional fork entry type pallets used in handling unit loads. Consisting of a modified Towmotor Unloader accessory with a gripping device built into the pusher frame, the Tow-Loader pulls the palletized load onto either blades or

forks and pushes it off at setdown points. Once unit loads have been placed on the pallet sheets, all further handling operations by the Tow-Loader are completely mechanical. Since cost of pallet sheets is small, they are left with unit loads for quick unloading at the receiving end. Towmotor Corp.

For more data circle No. 29 on postcard, p. 16.



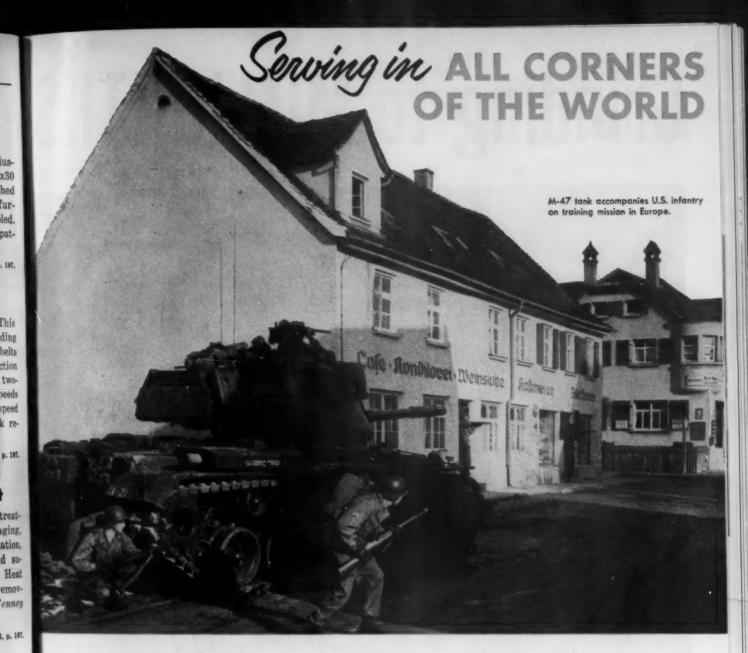
#### Dwell times possible with new turret indexer

A new clutch-operated series of turret indexing units permit dwell times ranging from 0.835 sec to infinity. Developed to supplement direct-drive turret indexing units, the clutch-operated models are available with 8, 16, 24 or 32 work stations and 20, 30 or 40 in. turret

diameters. Maximum indexes per hour range up to 2154. Harmonious indexing and accurate positioning are assured by cross over cam and locking device. Swanson Tool & Machine Products, Inc.

For more data circle No. 30 on postcard, p. 15.

Turn to Page 118



### **ARMOR PLATE for Ordnance**

#### BY AMERICA'S FOREMOST PRODUCER

Wherever peace and security are threatened by aggressors you will find armored equipment made in the U.S.A. standing guard. Engineering and metallurgical "know-how," combined with mass production techniques common to this country alone are building an arsenal of defense for all the world.

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Consider armor plate for tanks. Serving as key producer and coordinator for Ordnance armor plate programs has been a Standard Steel Spring

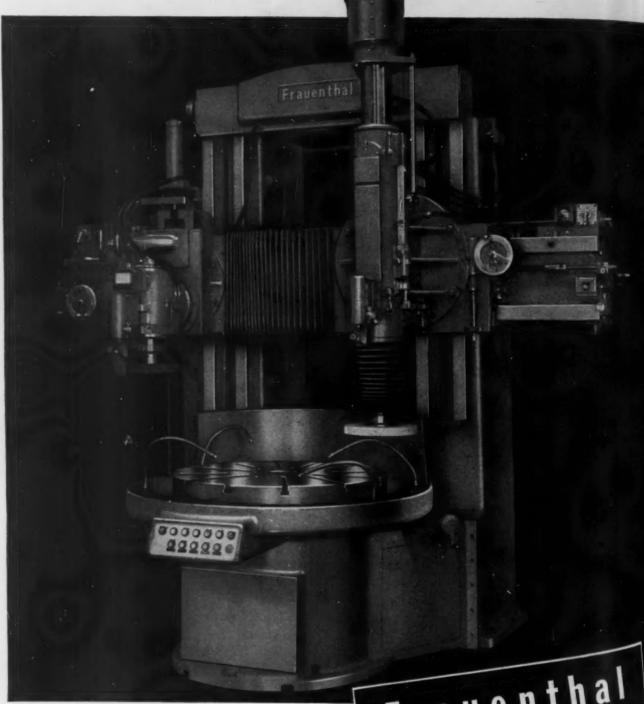
assignment for years. Our talents have contributed mightily to the design and production of many tank components. The flexible handling of our unexcelled manufacturing facilities has expedited shipment of an impressive tonnage of flat, formed, fully machined parts to all major tank producers. This program will continue until all who challenge the free way of life are made to realize the futility of attack.

## Standard Steel Spring Division

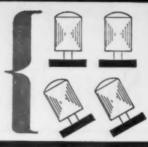
ROCKWELL SPRING AND AXLE COMPANY

Armor Plate Office: PENOBSCOT BUILDING, DETROIT, MICH.

## Grinding to MILLIONTHS



Many combinations of spindle positions for simultaneous grinding on all sizes of Frauenthal Grinders



Frauenthal
NULTIPLE-HEAD Grinders
YERTIGAL Grinders

FREGISION-GRIND INSIDE, OUTSIDE AND FACES SIMULTANEOUSLY TO MILLIONTHS OF AN INCH

# of an inch precision with Frauenthal Grinders

IMPOSSIBLE!... said one machine tool man UNBELIEVABLE!... said another, skeptically SHOW ME!...said a progressive executive

THIS is what we have shown many: You can get such super-precision grinding with these unique grinders that the normal method of expressing tolerances in tenths-of-thousandths of an inch became inadequate when precision was attained to fractions of tenths-of-thousandths, expressed best in MILLIONTHS of an incb.

#### IS PERFORMANCE-PROOF...details on request

	MAX. VAR. IN (Para	FACE THI	CKNESS		ICKNESS		
Station	Reading	Station	Reading	Station	Reading	Station	Reading
1	.000000"	7	.000000"	1	.000000"	7	+.000020"
2	+.000010"	8	+.000020"	2	+.000010"	8	+000010"
3	+.000030"	9	+.000030"	3	+.000020"	9	.000000"
4	+.000030"	10	+.000030"	4	+.000020"	10	000010"
5	+.000030"	11	+.000030"	5	+.000010"	11	000020"
6	+.000010"	12	+.000020"	6	+000020"	12	000010"

PRECISION	GAUGE	READINGS	CHART	NO.	2

- 1	MAX. OUT-OF-R	OUND OF	4 O. D.	MAX. OUT-OF-ROUND ON I. D.								
Station	Reading	Station	Reading	Station	Reading	Station	Reading					
1	.000000"	4	000050"	7	.000000"	10	000110"					
2	000020"	5	000080"	8	.000000"	11	000070"					
3	000040"	6	.000000"	9	000050"	12	.000000"					
Maxin	um Variation	Outside I	Diam: 000080"	Marin	um Variation	Inside I	Diam: 000110					

## Frauenthal Division

#### What is YOUR grinding problem?

We'll be glad to work with you on difficult grinding, boring, turning problems. A wide variety of combination grinding of outside and inside diameters or faces can be made SIMULTANEOUSLY to assure utmost precision and unfailing interchangeability of parts. Adaptations for specific jobs also can be engineered into these grinders for high production at low cost.

1800 36" 60" 36" 60" 42" 60" 48" 60" 2000 72" 88" 110" 120"		
SERIES	TABLE SIZES	MAXIMUM SWING
	30"	60"
****	36"	60"
1800	42"	60"
	48"	60"
	60"	72"
2000	72"	88"
	110"	120"
2200	120"	130"
2100	130"	140"
	140"	150"













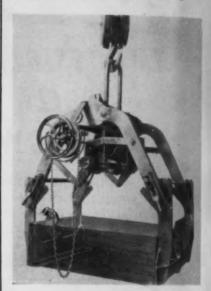


AGE

Continued

#### Sheet-coil lifter

Either sheet or coil steel stock can be handled with a new lifter that incorporates a hinged coil-bearing segment at the center of each carrying angle. When loose or bundled sheets are to be handled, the core bearers are swung 90° upward and locked out of the way, leaving the



carrying angles clear for lifting sheet. When used on coils, the bearers are swung down into carrying position and rest on the carrying angle where they have double bearing for extra strength and safety. The lifter is capable of handling up to 20,000 lb. Adjustment of jaws and carrying angles for handling different widths of sheet and coil stock is made in a few seconds. Cullen-Friestedt Co.

For more data circle No. 31 on postcard, p. 107.

#### Shoe saver

New silicone leather preservative keeps work shoes and leather equipment soft and pliable despite the deteriorating influences unavoidable in many industrial plants. The material is a clear fluid applied with a soft cloth or swab. Shoe Saver is water repellent, not a waterproofing agent. It does not seal the pores, but permits treated leather to breathe. Shoe Saver also increases resistance to flex-abrasion and heat. Dow Corning Corp.

For more data circle No. 32 on postcard, p. 187.

Turn Page



# "Certified" Abrasives clean more castings per dollar!

"Certified" Samson Shot and Angular Grit are made extra-tough by a special automatically controlled hardening process. They wear longer, can be used over and over again . . . actually clean more castings per dollar! Save money . . . switch to "Certified" Abrasives.

Accepted and used for over 55 years



PITTSBURGH CRUSHED STEEL CO., Pittsburgh, Pa.
STEEL SHOT AND GRIT CO., Boston, Mass.

VAN HUFFEL COLD FORMED METAL



Those odd shapes you see in the above picture show contour farming at its best—one proven way the farmer can maintain and improve his land and increase his yield without adding acres or manpower. Another way is through the use of more and better implements at lower cost. That's where you come in.

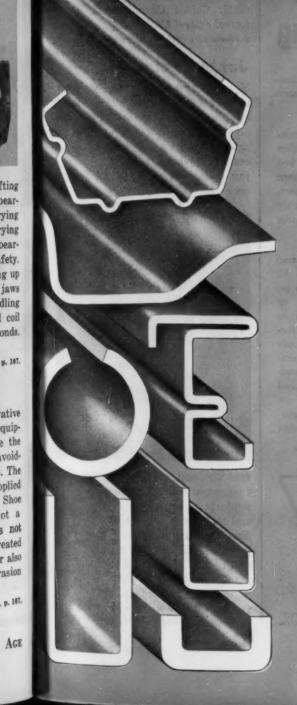
Making odd shapes in metal that definitely cut farm equipment production costs and inspire revolutionary design thinking is where we come in. Whether it's something you are now making or just a drawing board dream, transforming "shapes of mind" into shapes of metal has been a proven production technique of Van Huffel for over half a century.

With hundreds of case history applications showing down to earth production economies, we would like the opportunity of demonstrating how Van Huffel shapes can help increase your

Shown at the left are just a few of the many metal shapes Van Huffel has produced in various metals and in any lengths. Shapes can be cold formed to your specifications from strip widths up to 33" and gauges up to .312.



Where ideas take shape for makers of farm equipment



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## What you can do about your high cost of bulk Materials Handling

The picture above tells the whole story of the Dempster-Dumpster System of Bulk Materials Handling. Never before have you been able to cut bulk materials handling costs so drastically! One truckm o u n t e d Dempster-Dumpster handles the entire group of Demp-

ster-Dumpster Detachable Containers. It's like having scores of truck bodies for a single truck.

Containers are spotted at convenient materials accumulation points. When loaded each is picked up, hauled and emptied (as shown at left) . . . or load set down intact. Entire operation is handled by only one man, the driver, by hydraulic controls in cab.

Each container is designed and built in the desired size up to 12 cu. yds. to suit the materials to be handled—be they solids, liquids or dust... hot or cold... bulky, light or heavy. You can handle, at tremendous savings, materials of many descriptions—trash and waste materials, raw materials, finished products, etc.—with only one truck and only one man, the driver. Write to us for complete facts. Manufactured exclusively by Dempster Brothers, Inc.







DEMPSTER BROTHERS, 434 N. Knox, Knoxville 17, Tenn.

#### -New Equipment

#### FM die steel

Free-machining properties of its Olympic FM high carbon-high chromium die steel have been extended to Latrobe's entire line of high carbon-high chromium die steels which can now be obtained as FM steels. Improvement in the machinability of these steels has no effect on their other physical properties nor do they require any change in heat treating practice. Tests have shown that these FM die steels will cut machining time as much as 50 pct, the company reports. And the new material is said to produce a better machined surface. Now available in FM grades are Select B. GSN, Cobalt Chrome, and BR-4. Latrobe Steel Co.

For more data circle No. 33 on postcard, p. 187.

#### Jet blast cleaner

New low cost bench model jet blast cleaner puts this method of metal cleaning within the reach of the smallest metalworking shop. It is said to save up to 60 pct in labor costs in cleaning, burring, and etching metals. While small in size it operates with high efficiency in



speedily and accurately removing rust, scale and all types of foreign deposits from dies, molds, tools and other precision articles without dimensional alterations. This model is 24 in. diam x 43 in. high and weighs 155 lb. Liquid capacity is 2 gal and abrasive capacity is 13 lb. R. W. Renton & Co.

For more data circle No. 34 on postcard, p. 167.

Turn Page

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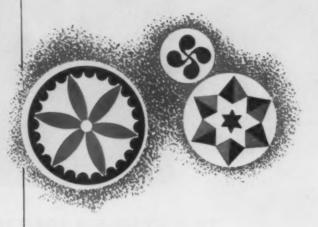
model gh and city is is 13

rd, p. 107.

N AGE

IN METALWORKING, THE PAYOFF'S AT AN R. D. WOOD PRESS LIKE THIS ONE!

This 3,000-ton hydraulic press is designed specifically for high-speed, heavy-duty die forging and ingot cogging. R. D. Wood presses are made for many uses, and in various sizes to suit production requirements. Ask for informative catalog, and for engineering aid—both yours without obligation.



In Pennsylvania Dutch country, the hex sign on the barn is mighty important.

The farmer has confidence in its power to protect against evil. In the business world, customers believe in, and rely on, the name of the manufacturer. For instance—to people in metalworking, woodworking, rubber and plastics, the R. D. Wood name is a sign of real value in hydraulic presses . . . good presses that turn a profit for them year after year. To you as a buying influence, the 150-year-old Wood name can mean a lot, too. Economy and efficiency in production, for one thing. If you like, we'll send you a descriptive catalog.



#### R. D. WOOD COMPANY

PUBLIC LEDGER BUILDING • PHILADELPHIA 5, PENNSYLVANIA

Representatives in Principal Cities















MAKERS OF HYDRAULIC PRESSES AND VALVES

FIRE HYDRANTS

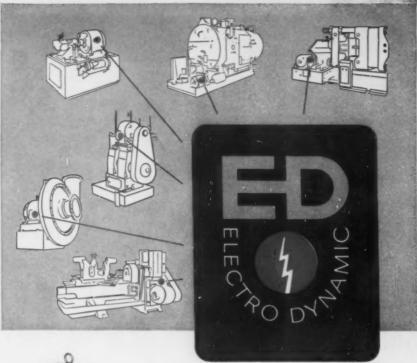
CAST-IRON PIPE

GATE VALVES

GAS PRODUCERS

ACCUMULATORS

March 11, 1954





## THIS EMBLEM IDENTIFIES EXTRA DEPENDABLE INDUSTRIAL MACHINERY



The red power spot on industrial machinery means "Powered by Electro Dynamic." Such machinery relies with confidence on the extra dependability of Electro Dynamic motors, the proven industrial motors which give industrial equipment extra dependable operation.

Conclusive evidence of the extra dependability of Electro Dynamic motors is now revealed in the new candid report "MOTOR SHOW-DOWN". The revealing proof is found in comparative tests\* conducted in accordance with A.I.E.E. standards. Don't miss your copy! Send the coupon below today.





1 to 250 hp. AC and DC. Standard or special purpose. N.E.M.A. standards.

## ELECTRO YNAMIC ependable motors

ELECTRO DYNAMIC - Division of General Dynamics Corporation 154 Avenue A, Bayonne, New Jersey

Please send me a copy of "MOTOR SHOW-DOWN" and the new catalog of Electro Dynamic industrial motors.



NAME	
COMPANY	7
ADDRESS	

#### New Equipment

Continued

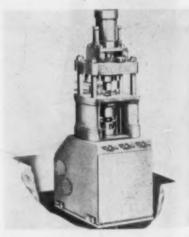
#### Diamond-studded belts

Commercial diamonds, embedded in a belt of extruded Du Pont nylon plastic, are solving die polishing problems posed by use of ultra-hard carbide in tube and rod drawing dies. The nylon provides a cushioning effect to keep the diamond grits from tearing out of their sockets. In tests, 460 dies have been polished with one diamond-studded nylon belt. Belts can be washed in warm, soapy water with no effect on the bond. Any type coolant can be used during polishing. Hartford Special Machinery Co.

For more data circle No. 35 on postcard, p. 107.

#### **Compacting press**

New powdered metal compacting press features adjustment during operation. High quality production of powdered metal parts at low cost are claimed for the 50-ton press. It is designed specifically for trouble-free operation. Moving mechanism is fully enclosed, pressure lubricated, and sealed against dust. Model L is a mechanical, four-



column, crank-type press equipped with flywheel, pneumatic clutch and pneumatic brake, and is driven by a 10-hp totally-enclosed motor through a variable-speed drive. A special feature permits quick, accurate adjustment for changes in compacted-part density or weight while the press is in operation. Hydraulic head assures accurate control of the pressure being applied, preventing overloading. Raldwin-Lima-Hamilton Corp.

For more data circle No. 36 on pestcard, p. 107.

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rd, p. 107.

N AGE

## the Iron Age

#### **SALUTES**

William C. Newberg

From mechanic to auto company president in 18 years is this energetic Detroiter's record.



BILL NEWBERG'S life seems to have been charted at an early age. He earned expense money for his senior year at college by selling new and used cars. And the thesis for his engineering degree at the University of Washington was on "The Road Testing of Low-Priced 1933 Cars."

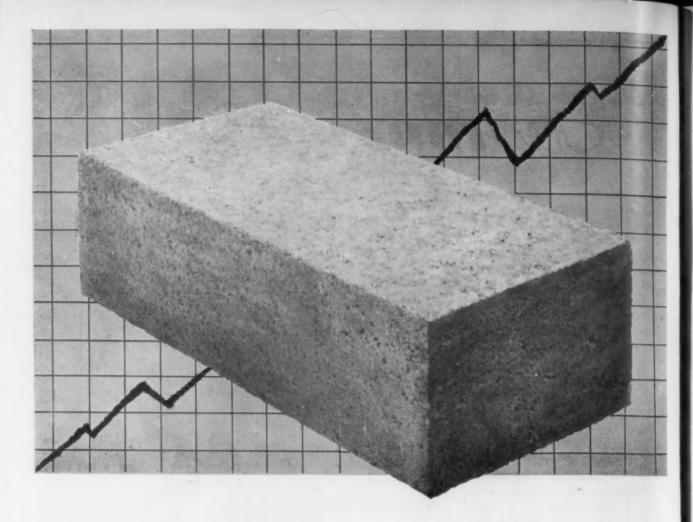
Shortly after his graduation he went to work for Chrysler as a road test mechanic, has since rapidly mounted the Chrysler Corp. promotion ladder until 1951, at the age of 40, he was named president of the Dodge Div.

Bill is probably the forerunner of a new class of automotive executives that is beginning to take over top jobs and key positions in the industry. This is a group of bright engineers who appear to be thoroughly dedicated to the auto industry and in many cases were even educated in their company's own educational institutions. Bill himself received his master's degree in 1935 from the Chrysler Institute of Engineering.

But in spite of this record of advancement, Bill is far from the nose-to-thegrindstone type. Genial and personable, he is one of the best liked of Detroit's automotive hierarchy. As a former test driver, he is probably proudest of the series of 196 AAA stock car records recently set by the 1954 Dodge on the Bonneville Salt Flats.

As a result, a Dodge will be pace car at this year's Indianapolis 500-mile race. Bill himself will be at the wheel, admits, "No one could possibly get a bigger kick out of actually driving the event."

March 11, 1954



#### INCREASE YOUR OPEN HEARTH BOTTOM LIFE

#### WITH PERMANENTE PERICLASE BRICK!

WITH Permanente Periclase "D" burned brick as the subhearth under a Permanente 165 bottom you get higher MgO per unit volume than possible with any other refractories available today.

Permanente Periclase "D" bricks provide 9.43 lbs. of MgO per 9" equivalent, plus *maximum* density with absence of connected voids. Used in combination with Permanente 165 you are sure of the ultimate in bottom safety and durability.

Write for descriptive literature on (1) Permanente Refractory Brick, (2) Permanente 165, and (3) the companion ramming mix, Permanente 84.

Principal sales office: Chemical Division, Kaiser Aluminum & Chemical Sales, Inc., First National Tower, Akron 8, Ohio.

#### Permanente Periclase Brick for the Steel Industry:

PD-B (Periclase "D" burned) brick for open hearth and electric furnace bottoms. Low in iron, lime and silica. Chrome free. Maximum MgO in bottom.

PCA, PCA-MC (Periclase-Chrome "A"), plain and metal-encased for open hearth end walls, front walls and uptakes. Metal-encased for electric furnace sidewalls. High in MgO. Outstanding all-purpose refractory.

CPA-B (Chrome-Periclase"A," burned) for open hearth front and back walls. Controlled chrome additives result in highest resistance to spalling.

CPA-MC (Chrome-Periclase "A"), metal-encased for open hearth back walls, front walls. D (Chrome "D" burned) for open hearth bottoms, soaking pits. High hot load strength.

Installation advice on request

## Kaiser Chemicals

Producers of the most complete line of basic refractories

BASIC REFRACTORY BRICK AND RAMMING MATERIALS . CASTABLES AND MORTARS . MAGNESITE . PERICLASE . DEADBURNED DOLOMITE

## the Iron Age

#### **INTRODUCES**

Paul Carnahan, appointed vicepresident and assistant to the president, GREAT LAKES STEEL CORP., Detroit; Albert C. Chiles, appointed a vice-president and general manager of sales.

E. Philbin de Got, elected vice-president, UNITED DRILL & TOOL CORP., Chicago.

Carl J. Demrick, elected vice-president in charge of manufacturing, PLYMOUTH MOTOR CORP.

C. Thorne Murphy, appointed a vicepresident and assistant secretary, MCLOUTH STEEL CORP.

Samuel W. Brown, named assistant to the executive vice-president, THE ROCKWELL MFG. CO., Pittsburgh; and John M. Pommersheim, becomes assistant to vice-president of research.

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High hot

OLOMITE ON AGE William F. Rochow, named assistant to the president-Research & Development, HARBISON - WALKER REFRACTORIES CO., Pittsburgh.

Charles V. Boulton, appointed director of budgets, INTERNATIONAL BUSINESS MACHINES CORP., New York.

Lawrence R. Obert, promoted to vice-president and general manager, SANTA FE TANK & TOWER CO., INC.

Charles T. Fisher, Jr., elected a member of the board, GENERAL MOTORS CORP., New York.

C. H. Hartley, elected sales director, SERVOMECHANISMS, INC., Long Island, N. Y.

R. E. McNeill, Jr., elected a director of AMERICAN SMELTING & REFINING CO., New York.

W. B. Duncan, named chairman of the board, WESSON CO., Detroit. E. Mortensen, appointed president, Wesson Tool Co.

William J. Lane, appointed legal counsel, BOHN ALUMINUM & BRASS CORP., Dearborn, Mich.

Marvin J. Phillips, appointed an abrasive engineer on the sales staff, BAY STATE ABRASIVE PRODUCTS CO., Westboro, Mass.

Orville H. Scheel, promoted to sales engineer, HYDRO-BLAST CORP.

John S. Hamilton, named manager of packaging foil sales, Development Div., ALUMINUM CO. OF AMERICA, N. Y.

George Sathre, appointed manager, Atlantic Branch Metal Div., NA-TIONAL LEAD CO., New York.

Ralph Morse, named plant engineer, CHANDEYSSON ELECTRIC CO., St. Louis.

Francis J. Kinsella, named manager of outside sales, STANDARD PRESSED STEEL CO., Jenkintown, Pa.

Dr. F. L. Stark, named manager, Agricultural & Mining Chemicals Dept., AMERICAN CYANAMID CO., at its Stamford Research Laboratories, Stamford, Conn.; Dr. J. F. Yost, named agricultural chemical group leader; and K. G. Nolan, becomes agricultural biological group leader.

P. J. Biegel, becomes manager, Cannery Equipt. Service Dept., CONTINENTAL CAN CO., New York, succeeding Percy S. Pederson, who has retired



HARRY B. McCLURE, appointed president, Carbide & Carbon Chemicals Co., a division of Union Carbide & Carbon Corp., New York.



WILLIAM ADAM JR., elected president, Ajax Electric Co., Philadelphia.



C. PAUL PORTERFIELD, elected vice-president and general manager, The Method X Co., an affiliate of Firth Sterling Inc., Pittsburgh.

March 11, 1951

William W. Heimbach, named manager of industrial relations, Steam Div., WESTINGHOUSE ELECTRIC CORP., Pittsburgh.

Donald A. FitzRoy, appointed manager, Industrial Products Div., METAL GOODS CORP.

John E. Childe, appointed manager, Philadelphia office, THE ISTHMIAN STEAMSHIP CO., New York.

R. A. Miller, named manager of manufacturing, Locomotive & Car Equipment Dept., GENERAL ELEC-TRIC CO., Schenectady.

Ralph H. Stalbaum, joins the sales staff, New York district office, F. J. STOKES MACHINE CO.

Robert L. Parrish, appointed manager, new plant SPRAGUE ELECTRIC CO., at West Jefferson, N. C.

H. L. Wagener, named special consultant to technical research group, KSM PRODUCTS, INC., New Jersey.

Richard E. Farrell, joins the sales force of VESUVIUS CRUCIBLE CO., Philadelphia district.

Ross Atkinson, becomes head of newly formed Atomic Accessory Dept., LAMSON CORP.

Andrew W. Hughes, named Eastern regional manager in charge of all company's manufacturing and marketing activities on the eastern seaboard, RHEEM MFG. CO.; and Thomas A. Kelly, becomes manager of manufacturing planning, Richmond, Calif., headquarters.

L. R. O'Rourke, appointed New York District sales manager, PENNSYL-VANIA INDUSTRIAL CHEMICAL CORP., Clairton, Pa.

W. C. Brigham, appointed assistant to manager, BETHLEHEM PACIFIC COAST STEEL CORP., San Francisco.

Robert E. Schroeder, appointed assistant district manager, Cleveland district office, LURIA BROTHERS & CO., INC.



ROBERT W. CLYNE, elected vicepresident-Marketing, Pressed Steel Car Co., Inc., New York.



A. M. RIDDLE, appointed executive assistant to the president, The Colorado Fuel & Iron Corp.



L. W. JORDAN, appointed vicepresident, Pacific Region, Linde Air Products Co., a division of Union Carbide & Carbon Corp.



C. L. PETERSON, appointed a divisional vice-president, Brown Instruments Div., Minneapolis-Honeywell Regulator Co.

#### Wide or Narrow...



Whether your production requires a few or many widths of sheet steel, 1 C-F Lifter, with its wide range of jaw and carrying angle adjustments will probably meet all your sheet handling requirements.

Adjustments are made by the operator in a few seconds, permitting the Lifter to shift from wide to narrow sizes almost instantly.

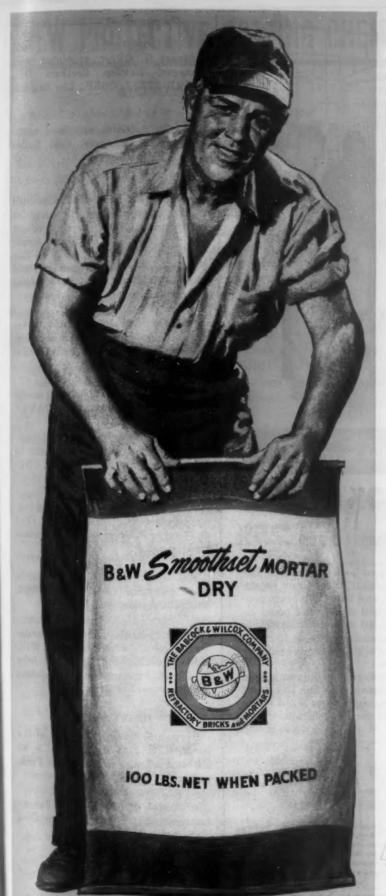
Because it can pick up, carry and unload more loads per hour, using less man and crane time than any other method, a C-F Lifter will soon pay for itself.

Bulletin SL-28 gives you the complete story of C-F Lifter advantages to you. Ask for ittoday. There's no obligation.



CULLEN-FRIESTEDT CO.

1303 South Kilbourn Avenue . Chicago 23, Illinois



# Now! B&W SMOOTHSET

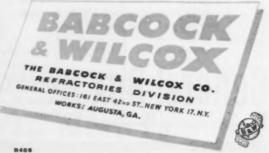
## Available in Dry Form

Here's the mortar refractories masons asked for—and it's as easy to use with insulating firebrick as the popular wet B&W Smoothset because it has the same high water retention.

This property is important because the highly porous structure of insulating firebrick draws the moisture rapidly from the mortar, thus allowing too short a time for proper placing and setting of the brick before most mortars become unworkable.

Besides high water retention, the new dry B&W Smoothset can be stored indefinitely in a dry place without hardening—a big advantage on large jobs when refractories are installed over a long period of time.

In addition to helping you select the most economical refractories, your local B&W Refractories Engineer will be glad to help you select the best mortar for your installation. Next time you build or reline your furnace, get the benefit of his long experience.



B&W REFRACTORIES PRODUCTS—B&W Allmul Firebrick \* B&W 80 Firebrick \* B&W Junior Firebrick \* B&W Insulating Firebrick B&W Refractory Castebles, Plastics and Morters \* OTHER B&W PRODUCTS—Stationary & Marine Boilers and Component Equipment... Chemical Recovery Units . . . Seamless & Welded Tubes . . . Pulverizers . . . Fuel Burning Equipment . . . Pressure Vessels . . . Alloy Castings

AGE



#### cut packaging costs 50% reduced shipping costs 25%

McCord Corporation, Plymouth, Indiana, solved both a packaging and a materials handling problem with the Generalift Pallet Crate shown above. Conferences with General Packaging and Sales Engineers produced a crate which held 24 radiators, packed easily, and could be handled by fork-lift from the shipping room all the way to assembly lines. It formerly took 24 heavy nailed crates and from 24 to 30 hours of labor to ready 96 radiators for shipment. Packing the same number in Generalift Pallet Crates takes only 4 hours.

This is only one example of the many packaging problems solved every day-at a saving-in General Box Company's two fine Industrial Packaging Laboratories. General Box packaging experts stand ready to help you cut packaging costs, too. Write for complete details.

Find out how other manufacturers are cutting packaging costs. Write for your free copy of "The General Box."



1873 Miner St., Des Plaines, III.

Factories: Cincinnati; Denville, N. J.; Detroit, East St. Louis, Kensas City, Louis-ville, Milwaukee; Prescott, Ark.; Sheboy-gan; Winchenden, Mass.; General Bex Company of Mississippi, Meridian, Miss.; Continental Box Company, Inc., Houston

#### ENGINEERED SHIPPING CONTAINERS FOR EVERY SHIPPING NEED

#### Personnel

#### Continued

Stuart K. Oliver, appointed sales manager, Rawlins Brothers Div. SOLAR STEEL CORP., Los Angeles, Calif.

Charles A. Grim, appointed assistant product manager, Cold Rolled Div., CRUCIBLE STEEL CO. OF AMERICA, Pittsburgh.

Herbert F. Middleton, appointed western area manager, Los Angeles headquarters, Acme Steel Products Div., ACME STEEL CO., Chicago: William H. Smythe, Jr., becomes San Francisco district sales manager; and Charles G. Moreau, becomes special representative.

Andrew G. Scott, promoted to assistant district sales manager, Detroit district, PITTSBURGH STEEL

John W. Peters, appointed southeastern district manager, DAVEY COMPRESSOR CO.

A. T. Olsson, becomes assistant to sales manager, ACHESON COL-LOIDS CO., Port Huron, Mich.

Howard H. Chapin, appointed superintendent REPUBLIC STEEL CO.; and George R. Goss, becomes assistant superintendent.

I. C. Matthiessen, appointed district sales manager, COLUMBIA TOOL STEEL CO., Los Angeles.

Paul R. Nichols, promoted to assistant general superintendent, WIS-CONSIN STEEL WORKS; and John R. Pigott, becomes second assistant general superintendent.

#### OBITUARIES

Norman F. Russell, chairman of the board, U. S. Pipe & Foundry Co., at his home recently in Edgewater Park, N. J.

William J. Brinkerhoff, 67, former manager of the Direct Sales Div. U. S. Steel Export Co.

F. M. Washburn, 59, assistant general superintendent, Wisconsin Steel Works, Chicago.

E. T. Wilson, Jr., 48, sales representative, Tubular Products Div., The Babcock & Wilcox Co., Portland, Ore. iv.,

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#### NEW PROTECTIVE COATING CHEMICAL FOR ALUMINUM

#### **ALODIZING**

Alodizing with "Alodine," a new technique in the protective coating of aluminum, was made available for production-scale use in 1946. Since that time Alodizing has largely supplanted the more elaborate, costly and time-consuming anodic treatments in the aircraft and other industries.

Continuous and successful industrial use has clearly demonstrated the simplicity and economy of the Alodizing process as well as the effectiveness of the "Alodine" amorphous coatings, particularly as a base for paint. In fact, the paint-bond that Alodized aluminum provides has been found to be superior to that possible with chromic acid anodizing.

The corrosion-resistance of unpainted aluminum Alodized with "Alodine" Nos. 100 or 300 is excellent, easily meeting the requirements of Specification MIL-C-5541. However, a need for protection of unpainted aluminum, even better than that obtained with chromic acid anodizing, has long been recognized.

#### NEW IMPROVED "ALODINE" DEVELOPED By ACP RESEARCH CHEMISTS

Several years of intensive research have now led to a new type of "Alodine," designated as "Alodine" No. 1200. This new protective coating chemical forms an amorphous mixed metallic oxide coating of low dielectric resistance that provides unusually high corrosion-resistance for unpainted aluminum. In addition, it forms an excellent paint bond that approaches closely the high quality obtained with the earlier types of "Alodine."

After having been tested for conformance with Specification MIL-C-5541, "Alodine" No. 1200 is now about to go into production.

#### PROCESS DETAILS

"Alodine" No. 1200 is the only essential chemical needed to prepare the coating bath and the final rinse bath. One of its unique features is that it can be used in tanks in an immersion process, or, in a multi-stage power washer in a spray process, or, with a slight adjustment of pH, with brush or portable spray equipment in a manual process. This means that even where the simple production equipment is not available, or where touching up of damaged coatings previously Alodized or anodized is required, excellent protection and paint bonding can still be obtained with practically no equipment.

"Alodine" Trade Mark Reg. U. S. Pat. Off. All three methods of application easily meet the requirements of Specification MIL-C-5541.

Process sequence for all three methods of application is the same as for other standard grades of "Alodine" such as Nos. 100, 300, and 600, viz.: 1. Pre-cleaning. 2. Rinsing. 3. Alodizing. 4. Rinsing. 5. Acidulated rinsing. 6. Drying.

Coating time in an immersion process ranges from 2 to 8 minutes and in a mechanized spray process is about 30 seconds. "Alodine" No. 1200 baths are operated at room temperatures (70° to 100°F.) and heating is required only if the bath has gotten cold after a "down" period.

#### RECOMMENDED USES FOR "ALODINE" No. 1200

"Alodine" No. 1200 is specifically recommended for coating wrought products that are not to be painted or are to be only partially painted; and for coating casting and forging alloys whether or not these are to be painted. "Alodine" Nos. 100 and 300 are still recommended for coating wrought products such as venetian blind slats, awnings, etc., that are invariably painted.

#### RESULTS OF TENSILE TESTS

This new "Alodine" not only retards visible corrosion and pitting, but as shown in the table below, the loss of ductility with "Alodine" No. 1200, both brush and dip, after 1000 hours salt spray was less than for chromic acid anodizing after 250 hours, and for "Alodine" No. 100 and a conventional chromate treatment after 168 hours exposure

PROCESS	SALT SPRAY EXPOSURE	COMPLIANCE WITH TENSILE REQUIREMENTS OF MIL-C-5541
CHROMIC ACID ANODIZING	168 hrs. 250 hrs. 500 hrs. 1000 hrs.	passes passes fails fails
BRUSH "ALODINE" No. 1200	168 hrs. 250 hrs. 500 hrs. 1000 hrs.	passes passes passes passes
DIP "ALODINE" No. 1200	168 hrs. 250 hrs. 500 hrs. 1000 hrs.	passes passes passes passes
DIP "ALODINE" No. 100	168 hrs. 250 hrs. 500 hrs. 1000 hrs.	passes fails fails fails
CONVENTIONAL CHROMATE TREATMENT	168 hrs. 250 hrs. 500 hrs. 1000 hrs.	passes fails fails fails

#### AMERICAN CHEMICAL PAINT COMPANY

General Offices: Ambler, Penna.

Detroit, Michigan

Niles, California

Windsor, Ontario

ACP PROCESSES

March 11, 1954



#### Bars - Shapes - Plates

#### immediate delivery from world's largest stocks

You get all your requirements in any quantity when you call Ryerson for bars, shapes and plates. You also get steel of sound, known quality and steel service know-how that makes your job easier.

Need bars? Our stocks are the most diversified as well as the largest and every bar is ordered to a definite spec.—even bars often referred to as "mild steel" are quality controlled to AISI spec. C 1015 for best forming and welding qualities consistent with usual tensile requirements.

Need structurals? Here you find the most complete selection, including extra-long lengths. And, you can depend on square, practically burr-less friction saw cutting because of our special method of blade alignment and frequent blade changes.

Need plates? You get them here up to 10 inches thick. And shops which have had difficulty forming A-7 quality plates will be glad to know that Ryerson now carries plates of forming and welding quality.

The completeness of these stocks enables you to combine all your carbon steel requirements on one order for lower prices under the Ryerson quantity differential plan and for lower freight rates. So, whether you need a single beam or a carload, call Ryerson for immediate delivery from the world's largest stocks.

Principal products: Bars, structurals, plates, sheets, tubing, alloys, stainless, reinforcing, machinery & tools, etc.



#### RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT. NEW YORK . BOSTON . PHILADELPHIA . CHARLOTTE, N. C. . CINCINNATI . CLEVELAND DETROIT . PITTSBURGH . BUFFALO . CHICAGO . MILWAUKEE . ST. LOUIS . LOS ANGELES . SAN FRANCISCO . SPOKANE . SEATILE





# ZINC PLATE On Cartridge Cases Meets Rigid Specifications



By C. E. Fisher Quality Control Manager





Norris-Thermador Corp. Riverbank Ordnance Plant Riverbank, Calif.

- ♦ Individually, the chemical processes in zinc plating large-caliber steel cartridge cases by Norris-Thermador Corp. at the Riverbank Ordnance Plant are neither complex nor unique... Collectively, they produce a coating which meets the most rigid specifications.
- ◆ Concentrations, freedom from contamination and operating temperatures of solutions are of utmost importance in maintaining high production and quality . . . The fully-automatic plating is a complicated mechanical accomplishment . . .
- Maintenance of equipment is an absolute must since breakdown of a single component may mean failure of the entire line... By zinc plating the cases, which were previously made of cartridge brass, substantial quantities of copper and zinc are saved.
- ♦ UNTIL 1942, virtually all large-caliber cartridge cases were made of cartridge brass, an alloy containing about 70 pct copper and 30 pct zinc. At the outbreak of World War II, it appeared that needs for national defense might outstrip supplies of these metals. Steel was proposed as a substitute for brass. The Norris-Thermador Corp., Los Angeles, together with several other manufacturers, was given the job of

developing steel artillery cartridge cases for the armed forces.

Steel, as a substitute for brass, had three limitations: (1) a high tensile modulus of elasticity which produced low recovery or springback and tended to cause steel cases to stick in the gun chamber after firing, (2) marked notch sensitivity which often caused rupture during firing, and (3) poor resistance to corrosion.

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Faced with these limitations, Norris and the Army Ordnance Corps undertook a comprehensive development program to solve these problems. Success of this program is evident from the millions of steel cartridge cases that Norris successfully made for the Army and Navy during World War II. Moreover, the manufacturing techniques developed have served as a standard for the bulk of the industry.

Substitution of steel for brass made it necessary to develop a corrosion-resistant coating to protect the steel base material. Phenolic varnish and zinc plate are the two coatings now in general use. Cases for the Army are usually protected with phenolic varnish. At the Riverbank (Calif.) Ordnance Plant, operated by Norris, cases for the Navy are zinc plated in equipment built by Hanson-Van Winkle-Munning Co.

Specifications for steel cartridge cases call for a corrosion-resistant coating which will not react with or affect the propellant or other ammunition component which it may contact in service. The coating must not be more than 0.0005 in, or less than 0.0002 in, thick. Cartridge cases must also withstand a 20-pct salt spray at room temperature for 120 hr without exhibiting rust from the base metal, and accumulation of corrosion products from decomposition of the coating must not prevent gaging.

Coatings must also withstand corrosion produced by contact of dissimilar metals at the mouth and primer chamber. Formation of rust, when cases are scratched through to the steel, is not permissible. In addition, coatings must withstand deformation without loss of adherence, flaking, or peeling, and be free from imperfections such as uncoated areas, scratches, abrasions, checking or peeling.

At Riverbank, the zinc plating process selected consists of three basic functions: preparation of surfaces, application of the plate, and application of a zinc chromate conversion film. These functions involve twenty-three separate

processing operations.

The first operation is cathodic electrocleaning which removes grease, oil and other soil to promote uniform acid pickling in a subsequent operation. The solution used is 8 oz per gal of a proprietary alkaline cleaner compound, operated at 140°F. Current density of 30 amp per sq ft provides the desired cleaning action.

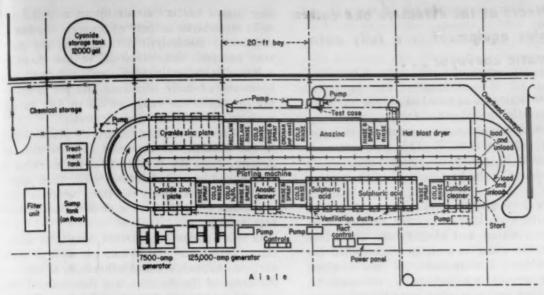
In two overflow rinses which follow, fresh water is pumped continuously into each rinse tank. This minimizes contamination from rinsed-off chemicals. In the second rinse, top sprays provide additional rinsing action.

Mouths of cartridge cases are coated with a heavy film of iron oxide as a result of a previous

#### DESCRIPTION OF PLATING CYCLE

						Tank struct	ion	Ma		P	umpa			Hea				Hoods	E	lectri	le
OPERATION	SOLUTION	Concentration (Oz per Gal or Pct)	Time (sec)	Temperature (deg F)	All Steel	Rubber Lined	Lead Lined	All Iron Pipe	Lead Pipe	All fron	Worthite	Duriran	Centering Devices	Iron Pipe	Load Pipe	Top Sprays	Air Blowoff Jets	Ventilating Exhaust h	Selecture Rectifier	Motor Generator	Current Density, amps per sq ft.
1. Cathodic Clean	Turco Prosoly B		56	140	x			x		x			×	x				x	x		30
2. Overflow Rinse	Water		11		947			-		-	****		-	-	****						
3. Overflow Rinse	Water		11		X			X				****	X			X					
4. Mouth Pickle	Inhibited Sulphuric				-			-												1	
4. MODELL LINKE	Acid	10 pct	191	150		X			X						X			X			
5. Overall Pickle	Inhibited Sulphuric			100	****	-		****	-						-						
or ormani i maie	Acid	10 pct	101	150		X			X			X	X		X			X			
6. Overflow Rinse	Water	to por	11			X			-			-	-								
7. Overflow Rinse	Water		88			X		X					X			X					
8. Anodic Clean	Turco Promoty B		56 56	140	Y .	-		X	****	X			l û	X		-		X	X		30
9. Overflow Rinse.	Water	16	11	140	X			1 Ŷ		-		****	X	-	****	Y.		-	-	****	
10. Acid Rinne	Inhibited Sulphuric			*****	1		****	-	****	****	****	****	1 ~		****	~					
TO. PICIO FIRMO	Acid	10 pct	11		1	l v	1				1										
11. Overflow Rinse.		and Read	11			1 P	****				****		****		****	****					
12. Overflow Rinse	***		11		***	10		. v					. w		****	. W					
13. Zinc Plate	Water Alkaline Cyanide		416	90	X	^		X	****	X		****	X	X		^		Y.		X	35
14. Reclaim	None	-	11	90	Î			^		-		****	-	^		****		^		-	00
15. Reclaim Rinse.			11		346						****										
16. Overflow Rinse	***************************************		111	****	10	4550	***				****	4466		****	****	· v				****	1
17. Overflow Rinse.			111		Ŷ			Î				****	Î	****		x					1
				****			1.0		X		. X										
18. Not Used	None		11				X	100	X		A		X			X					
19. Overflow Rinse	Water		11	****	1-2			X	****	1.0			1 0	1.2		A			1		10
20. Anozinc	Anozine	32	186		X		1		1000	X			1 3	X					1	***	100
21. Overflow Rinse	Water		11				. X	X				***	X	1.33		X	1				****
22. Overflow Rinse	Water		11	125	X	***				+× × ×				. X		****	A				
23. Dry	None		236	150	1	1															

NaOH-15 oz per gal. NaCN-15 oz per gal. Zn-516 oz per gal.



LAYOUT OF PLATING SETUP gives some idea of size and complicated mechanical accomplishment in building this fully-automatic machine to

operate as a single integrated unit. Chemical and mechanical control are of utmost importance in meeting rigid plating specifications.

processing operation. This oxide is removed with a 10-pct solution of sulfuric acid operated at 150°F. A pickling inhibitor is added as required to prevent excessive acid attack on the steel.

An overall pickle in a 10-pct solution of sulfuric acid at 150°F removes acid-soluble soil and superficial oxides from the work surface. To prevent excessive acid attack on bright machined surfaces, a wetting agent, as well as an inhibitor, is used. The wetting agent increases the effectiveness of the inhibitor. This pickling operation is then followed by two overflow fresh water rinses.

#### Close control insures quality

An anodic electrocleaning operation then removes pickling smut, any acid insoluble soil which remains after pickling, and iron salts which may be present on work surfaces. The solution consists of 12 oz per gal of the same proprietary alkaline cleaner used in the first cleaning operation. It is operated at 140°F. The work, however, is anodic to prevent electrodeposition of any metallic impurities present in the solution. An overflow fresh water rinse, with top sprays for thorough rinsing action, then follows.

The work is then subjected to a 10-pct solution of sulfuric acid, with no inhibitor added, operated at room temperature. This acid rinse removes any oxide films produced by the action of the electrocleaner. Two overflow fresh water rinses follow.

In the zinc plating operation, four major factors must be closely controlled to insure continuous high quality production. These include:
(1) current density, (2) composition of solu-

tion, (3) temperature of solution and (4) maintenance of workholders.

Current density on each circuit is controlled accurately by adjusting the voltage controls of the generators. Representative cartridge cases are selected daily for determination of plating thickness. Optimum plate thickness is 0.0003 to 0.0004 in. and is obtainable with a current density of 35.0 to 37.5 amp per sq ft of surface to be plated.

The alkaline cyanide plating bath consists essentially of sodium hydroxide, sodium cyanide and dissolved zinc. Although the 10,700-gal volume of solution prevents rapid changes in composititon, a chemical analysis is performed during each 8 hr of operation. Daily standard additions of caustic, cyanide and zinc anodes make up for depletion due to drag-out and electrodeposition of zinc on the work. Other additions are made as required to maintain the solution strength and balance.

Contamination of the plating bath occurs in the form of carbonates and heavy metal impurities. Carbonates, a result of the reaction between the plating bath and air, build up very slowly and are removed at infrequent intervals by adding hydrated lime. Carbonates are reduced by the formation of insoluble calcium carbonate which is precivitated, washed to recover soluble cyanide, and dumped.

Heavy metal impurities usually occur as lead or cadmium. Small amounts of these can seriously affect the appearance and corrosion resistance of the zinc plate. Presence of such contamination is determined by daily laboratory analysis of the solution. Small additions of polysulphide are made regularly to precipitate

#### Heart of the extensive and complex equipment is a fully automatic conveyor . . .

such contaminants as metal sulphides which are subsequently filtered out of the solution.

Nominal operating temperature of the zinc plating solution is 90°F. This temperature is maintained by automatic steam regulators in the feed line to the heating coils of the plating tank.

When poor quality work is encountered occasionally, even though current density, solution composition and temperature are under control, the cause is usually traceable to the workholders. Misalignment of workholders, worn or improperly adjusted electrical contacts, or corroded conveyor arms or workholders, are the most common sources of trouble. Preventive maintenance is the most satisfactory control over such difficulties.

Drag-out of the zinc plating solution on the work and workholders is substantial. Excess drag-out is permitted to drip into a tank and when sufficient solution has accumulated, it is pumped back into the zinc plating tank. A reclaim rinse which follows removes most of the zinc plating solution remaining on the work and workholders. Rinse water is pumped into the plating tank at the end of each shift to make up partially for losses by evaporation. Two rinse tanks, the second with top spray, provide additional rinsing.

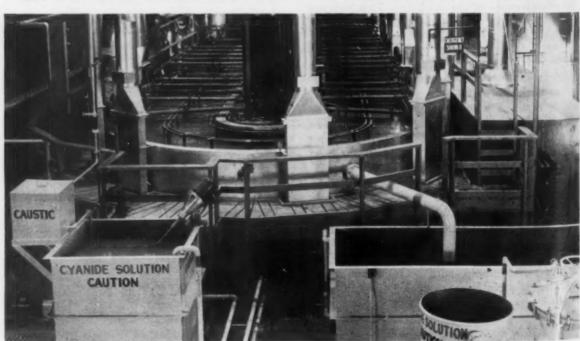
The automatic plating machine was designed to apply a zinc chromate conversion film to the zinc plated surface either by an acidified dip or by electrolytic action. At present, this film is applied by electrolytic action, using the Anozinc process. Concentration of the Anozinc solution is determined by specific gravity and by means of daily titrations. Its pH is maintained within the range of 5.5 to 6.0. In depositing the film, the work is anodic.

Thickness of the film is directly proportional to the duration of exposure and the current density. Since the dwell cycle of the machine is determined by considerations other than application of the Anozinc, the time factor is constant, and film thickness is proportional to current density.

In this application, current density is maintained between 10 and 15 amp per sq ft of work surface. Appearance and adherence, as well as thickness of the Anozinc, are functions of the current density. Low current density will produce very pale irridescent films, whereas, excessively high current density will yield deep yellow, non-adherent coatings.

Two overflow fresh water rinses follow. The first of these rinse tanks is equipped with top sprays. The second rinse tank has air blow-off jets which remove the pool of water from the flat work surface.

Drying is done with hot air. The air is recirculated over finned-type heat exchangers, through ducts and manifolds, and is discharged through numerous %-in. diam jets which direct the air blast against the external surfaces of the cartridge case, then through the workholder anode to the inside of the cartridge case. A duct with intake ports at the top of the dryer carries air to the suction side of the recirculating fan.



STEEL CARTRIDGE CASES pass through cyanide zinc bath (foreground) in plating cycle consisting of 23 separate operations. Each opera-

tion is closely controlled so that collectively they produce a zinc coating which meets the most rigid military specifications.

Air temperature is maintained at about 150°F.

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Equipment in this installation is both complex and extensive. The heart of the plating machine is a fully-automatic elevator-type conveyor. It has a vertical lift of 54 in. and a forward transfer of 36 in. during each cycle. One of two separate drive systems operates the elevator mechanism. The other provides forward transfer.

Transfer time, including lift, forward transfer, and drop of the conveyor is 34 sec. Dwell after each transfer is adjustable between 0 and 120 sec by means of an electric program timer. In this application, dwell time is 11 sec. Unit cycle time is equal to dwell time plus transfer time, and is the controlling factor in the production rate.

The conveyor has 50 copper carrier arms extending outward from a central structure which supports the conveyor and the mechanism for the conveyor drive. The carrier arms support the workholders and conduct current from the bus bars to the workholders.

Each arm is of bipolar construction consisting of a large weight-carrying member to which a smaller member is attached by insulated couplings. Each member of the conveyor arm is equipped with sliding-shoe electrical contacts which make up the electrical circuit with bus bars mounted on the central structure.

#### Air bubbles eliminated

Two bipolar workholders are suspended from each conveyor arm. Two J-shaped copper bars joined together, using a Teflon insulating gasket, from a U-shaped framework. An Inconel tube, which serves as an internal inert electrode during zinc plating, extends through a yoke and upward inside the cartridge case. Except for electrical contacts and the internal electrode, the workholder is coated with a ½-in. thick vinyl resin coating.

Each workholder holds two cartridge cases which are placed vertically and mouth down over the internal electrode. In this position, an air bubble trapped inside the head would prevent processing that part of the case. To overcome this, a funnel at the bottom of the electrode collects the processing solution which is forced through the hollow electrode and out the top. A double-cone head with spiral shaped vanes between the cones at the top of the electrode directs the solution into the air pocket inside the cartridge case head and imparts a swirling action. This displaces the air bubble and subjects all surfaces to the solutions.

Various types of contact points have been used. The most successful of these has a tapered surface. Contacts are positioned so that the mouth of the case rests on the tapered surface but will not slip down over the lower edge of the contact points. An insulated locating pin at the top of the internal electrode centers the case with respect to the electrode thereby pro-

moting even current density and uniform plate thickness on internal surfaces of shell cases.

Direct current requirements are supplied by both rectifiers and motor-generator sets. Rectifiers supply current for the electrolytic cleaning operations, and for application of the Anozinc. They are the selenium type with variable voltage output from 0 to 15 and maximum current output of 4000 amp. Two generators supply current for zinc plating. One for the external plating circuit has a 12,500-amp output. The second with a 7500-amp output is used for the internal circuit. Both generators have a variable voltage output from 2 to 10 v.

#### Zinc dissolves anodically

When placed on the workholder, the steel cartridge case becomes one of the electrodes for both circuits. Polarity of the case will depend on the requirements. In the first electrolytic cleaning operation and in zinc plating, the work is cathodic. It is anodic in the second electrocleaner and Anozinc sections.

Electrodes of polarity opposite to that of the case consist of the internal electrode of the workholder for the internal circuit, and flat mild steel plates suspended from bus bars along the tank edges for the external circuit. In the zinc plating tank, external circuit electrodes consist of coiled wire baskets suspended from the bus bars and filled with cast balls of high purity zinc. During plating, the balls are dissolved anodically.

An 800-gal cyanide solution makeup tank with a motor-driven agitator is used for preparing chemical additions to the zinc plating solution. Solution from the zinc plating tank continuously overflows a weir into a 1200-gal sump tank. It is then pumped through a leaf-type diatomaceous earth filter unit and back to the plating tank. A 12,000-gal storage tank allows for draining of the zinc plating system when maintenance or repairs are necessary.

#### Heat forced through ducts

Heat for maintaining solutions at temperature is obtained from steam heating coils suspended on the sides of the tanks. Thermostatically-operated steam feed control devices automatically maintain the desired temperature. Condensate is discharged through traps to the gutter and sewer system.

Heat for the hot air dryer is supplied by fin and tube-type heat exchangers. Hot air is forced through ducts and manifolds and discharged through numerous \(^3\epsilon\_{\text{in.}}\) diam jets.

A double-cone head with spiral vanes swirls solution inside the case to displace the air bubble.

# DEBURRING: Modern Methods, Tools Cut Costs

By John E. Hyler
Consultant
John E. Hyler & Associates
Peoria, III.



Part I

- Take another look at burring, chamfering and edge-breaking operations . . . They may offer plenty of room for savings in production costs . . . Improved methods, equipment and tools can help you cut costs on this most common metalworking operation.
- Combine chamfering with other machining operations where possible to eliminate burrs at their source... Keep dies sharp to reduce burrs on stamped parts, make it practical to eliminate burrs in "must" burnishing operations which follow.
- New cutting tools speed chamfering of holes... Wider use of abrasives can speed deburring... Power driven tools cut time per part, boost volume of parts an operator can handle.

MR. HYLER brings to THE IRON AGE more than 20 years' experience in all phases of shop work. His studies and research have given him a broad practical knowledge of manufacturing problems.

♦ PROPER EQUIPMENT, tools and methods can substantially reduce, and in some cases eliminate, one of the most common problems in metalworking operations—burrs. Modern engineering practice has put more and more emphasis on burr-free, carefully chamfered or broken edges.

Because of high costs and large amounts of labor involved, industry has sought new approaches to chamfering and deburring operations. Answers have been found in wider use of blast cabinets, power driven wire brushes, barrel finishing, specially designed burring and chamfering machines, improved and new forms of abrasive materials and better burring tools. With improved equipment and tools industry has put burring on a production basis.

Selection of a deburring method or tool is largely determined by the volume of parts to be handled. On specific types of work, where volume is large, use of specially designed machines may be warranted. Equipment designed for deburring holes, tubing or gears is widely used.

#### Take another look at methods

Methods which aim to eliminate burring or chamfering operations or combine them with another machining operation save production time and reduce labor costs. Where material is cut to length, heavy burrs produced, are often difficult to remove. To eliminate burrs some machines used for cutting off pipe, tubing, and shafting also chamfer both outside ends of the stock. Modern automatic screw machines often provide some type of part support at cut off. The part, rather than breaking off of its own weight, is cleanly severed by the tool. Greater care in selection or maintenance of tooling can



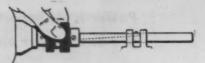
BOTH EDGES OF two holes, four in all, are deburred in one pass with this deburring tool.



CUTTING BLADE within pilot shaft burrs first edge. Tool can be chucked in drill press.



SLIDING KNURLED sleeve back retracts blade as workpiece moves along shaft.



CUTTING BLADE reaches hard-to-get hole edges; when sleeve returns, blade moves out.

often reduce burring. Where thin-walled or thin-sectioned parts are cut off, as on a bandsaw, a finer-toothed blade may produce work with less heavy burrs. Some metal-cutting bandsaws have controllable cutting pressure to eliminate heavy burring when thin-walled sections are cut.

Badly worn dies produce stampings with heavy burrs and drags. The heavier these burrs are, the longer it takes to remove them. Where stampings are routed through a burnishing barrel, burrs will also be removed if they are not too heavy. It pays to keep stamping dies in good condition, despite some extra cost, to specified to lighten a burring operation or permit barrel deburring.

Material selection can be a factor in reducing burrs. Where soft material is processed into stampings, burrs will be heavier than on harder stock. A harder material may sometimes be specified to lighten a burring operation or permit barrel deburring.

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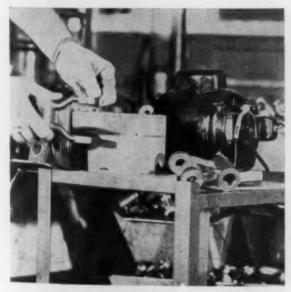
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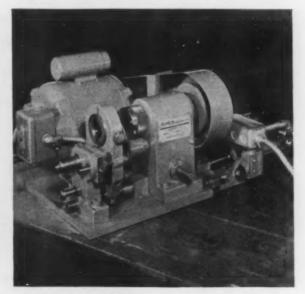
Regardles of care used to eliminate or reduce formation of burrs during machining they will present a problem on a wide range of work. Burrs develop wherever holes are drilled. To handle such burrs special burring reamers are used. These are effective only on the "entry" side of the drilled hole. This limitation led to development of a tool to burr both sides of a hole. The tool, which can be used in a drill press, consists of a shaft, of suitable size to pilot in the hole being deburred. At one end of the shaft is a free-rolling sleeve which can be shifted axially by hand while the shaft rotates.

A double edged cutting blade is recessed in the shaft. As the sleeve slides back and forth, the blade advances into cutting position or draws back into the shaft. A foot pedal may be used to control cutting blade movement and speed handling of workpieces. Another form of this tool simultaneously chamfers front and back faces of drilled holes in material to 5/16 in. thick. Chucked in a portable drill, the tool is widely used for deburring rivet holes in aircraft frame structures. It may also be used in a drill press, turret lathe or polishing lathe.

Coated abrasive materials have been developed to handle many burring operations. Flexible abrasive disks slit radially are widely used to burr one or both sides of relatively large holes in one operation where the material is not too thick. Two disks slightly larger in diameter than the holes to be burred are clamped on a small mandrel chucked in drill press or power drill. The spinning disks are thrust through the hole then pulled back. Disks



SMALL BURRING MACHINE with vertically mounted cone cutters rapidly burrs parts.



SPECIAL BURRING and chamfering machines rapidly handle large volume of cut off tubing.

#### Power is an important factor in boosting the volume of parts handled per hour or per operator, improving quality of burring operation . . .

are mounted pack to back and abrasive contacts hole edges on both sides of a short or thin workpiece.

Burrs can be removed from either side of relatively small flat parts by sliding the parts between the flat face of an abrasive disk and a flat backing support. The principle can be applied to a number of deburring operations.

Where corners are to be broken or burred on relatively large and bulky workpieces, portable reciprocating-pad sanders are often used. Such tools are available in both air and electrically driven models.

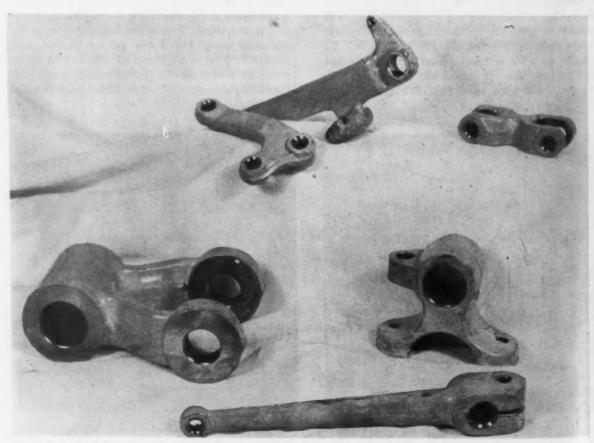
Radius type hand deburring cutters have been developed chiefly for removing burrs from holes which do not require reaming. Radius and tooth arrangement are such so that finish in the hole and on the face of the part are not disturbed in burring. The amount of radius depends on pressure applied. These hand deburring cutters are available in high speed steel and carbide. The part can be burred with a twist of the wrist. The tool can also be removed from the handle and chucked in a machine.

Ball-nose deburring mills are often used in portable power tools. A suitable size mill

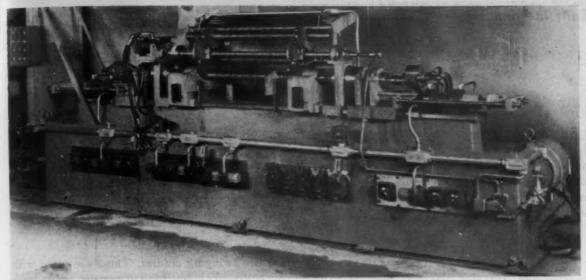
though thrust into a hole at a slight angle, will produce approximately a 45° chamfer. Similar milling tools equipped with a small point or guide are much used for deburring oil holes in crankshafts. The guide on the end prevents the mill from slipping out of the hole and marring the surface.

Power is an important factor in boosting the volume of parts handled per hour or per operator, and in improving the quality of the deburring or chamfering operation. One widely used deburring machine weighs only 18½ lb. It may be mounted on heavy plywood, for portability, or on a floor stand. The machine mounts a cone-shaped, toothed cutter face upward. The tube or part to be chamfered is pressed down on the revolving cutter. A machine of this type is useful for burring a variety of hole diameters in a part in a single handling.

So much cut off tubing is used in industry that considerable equipment has been developed for tube end deburring. Inside and outside cutters are needed to burr tubing. Outside cutters may also be used on shafting and rod ends, either offhand or in automatic screw machines. Cutters are available, in many standard



TYPICAL PARTS deburred on cone-shaped cutters. Several holes can be burred in one handling.



WELD FLASH IS removed and both ends of automobile torque tubes chamfered on this spe-

cial tube end finishing machine. Loading rack and reel type feed unit speed operation.

sizes for both inside and outside deburring.

Combination cutters chamfer both inside and outside tube ends in one operation. Other cutters produce a rounded lip at the end of tubing or pipe. Still another type both deburrs and squares tube ends.

Tube end deburring and chamfering machines are highly developed. One type machine clamps the workpiece in perfect alignment with fast-revolving cutters, and positions the tube end-wise by a stop which swings out of the way as the workpiece is advanced toward the cutters. These operations are controlled by hand lever or pneumatic cylinder and switch. Machines of this kind, in several sizes, handle tubing to 5 in. in diam.

Efficient double-end, automatic end-finishing machines for tubing have been engineered for many special applications. These burr both ends simultaneously. In a typical application, a machine simultaneously chamfers and removes weld flash on both ends of automobile torque tubes. Similar machines are also used to finish the ends and cut ejector grooves in shell casings.

#### Combine operations to cut costs

Some special tubing cutters combine deburring with other operations. Some of these cutters incorporate a pilot, to hold the cutter assembly in true relative position to the tube. Some cutter arrangements include a facing bit between inside and outside deburring members to square tube ends during the chamfering operation.

Other deburring tools ream tubes to size inside, size tubes outside with a hollow-mill arrangement, or permit use of a special flaring or expanding mill. These operations can be performed in combination with end facing, in-

side and outside deburring, or both. Both the inside and outside of intersecting holes in cross-drilled tubes may be deburred with special tools.

Scraper type burring tools are widely used in the aircraft industry on sheet materials. Edging mills do a similar job in burring edges of sheet-metal aircraft parts, stampings, large sheet layouts and strips. One or both corners of an edge may be deburred.

#### Edge mill cleans sheetmetal burrs

Edging mills have two separate cutting members, each with cutting teeth on one face. Cutting teeth on the two faces are opposed, and set for righthand rotation. When the cutting faces are set to face one another, and the edge of the sheet is run between them, both corners of the edge are burred at one pass. By reversing one of the cutting members, the safe edge acts as a guide, opposing the one cutting member. This guide may be positioned for depth of cut.

Edging mills of this type, to eliminate much hand filing and scraping. They can be used effectively on steel, aluminum, magnesium, brass, cast iron, forgings, rubber, plastics and fiber. In die grinders drill presses, and portable tools, they can be used at speeds to 10,000 rpm. Teeth are ground from the solid, and tools are available in both high speed steel and carbide. Where practical, a lubricant is used. Paraffin is recommended with aluminum.

#### Deburring: Power Key to Lower Costs

Part II of Mr. Hyler's article on modern shop methods of reducing deburring costs will appear in a later issue of The Iron Age. Widespread application of power to deburring operations, growing use of special machinery, wider use of abrasives, wire brushing and blast methods, and development of improved methods of tumbling will be considered.

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## **Automated Units**

◆ Automotive camshafts are automatically processed through two turning and gaging operations on bearing segments . . . New-type transfer units are easier to maintain, eliminate handling . . . Each automated assembly will produce up to 112 turned and gaged camshafts per hour.



By E. J. Egan, Jr. Machinery Editor

♦ BUILT-IN GAGING, non-obstructing work loading and transfer devices, and ease of maintenance are cost-cutting features of new automated units to be installed in two Detroit automotive plants for machining camshaft bearing surfaces.

Manual handling and gaging of workpieces will be eliminated. Each unit will automatically convey up to 112 camshafts per hour through two turning operations and two gaging stations, finally discharging parts onto a conveyor.

The equipment, designed and built by the Seneca Falls Machine Co., Seneca Falls, N. Y., was recently demonstrated at the builder's plant. Although the demonstration was conducted on camshafts supplied by a customer, automatic machining, gaging and transfer units of this type are suited to a variety of lathe operations commonly performed on shafting.

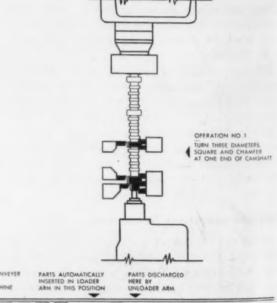
Cycle begins after the alloy cast iron camshafts have been milled and centered on both ends. Cam lobes are flame hardened, but for fast machining, shaft ends and intermediate bearing sections are left as-cast.

To turn, square and chamfer all bearing segments requires two Seneca Falls LR Lo-Swing lathes in each automated assembly. Lathes are equipped with automatic work loaders and unloaders. These trolley-type handling devices move above the lathes by means of a helical cam mechanism. Attached to each trolley carriage

are two swinging cradles. These are fitted with air actuated clamps to grip camshafts for loading and unloading lathes.

When the trolley-type work handler is positioned over the lathe tailstock, it is in line with work transfer conveyors. These feed rough workpieces to the lathe-loading cradles and transfer finished work from unloading cradles to the next station in the cycle.

Following the first lathe operation, the unloader cradle deposits a partially machined camshaft on a turntable. This swings the work end



SCHEMATIC DIA-GRAM of automated line for turning and gaging camshaft bearing segments.

## **Speed Turning, Gaging**

for end, positioning it for automatic electric gaging and transfer to the second lathe where remaining bearing sections are machined.

Air cylinders elevate camshafts into each gaging station. Multiple electric gages check diameters of bearing segments. A panel signal light indicates any off-tolerance diameter, warning that a tool change or adjustment is necessary. At this signal, the lathe stops automatically and the off-tolerance shaft is held at the gaging station, insuring that the same error is not repeated on succeeding workpieces.

After passing the gage check, camshafts are transferred to the second lathe or to subsequent straightening and grinding operations.

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Multiple carbide tooling is used in both Lo-Swing lathes. Tools are preset to accurate length in magazine or individual tool holders, permitting rapid tool changes when required. Air cylinders actuate lathe centers and 3-jaw chucks for quick, accurate positioning of work.

An important feature of the installation is the provision for banking a supply of camshafts on conveyor racks ahead of each lathe. This allows either lathe to continue automatic operation while its companion machine is stopped for tool replacement or adjustment.

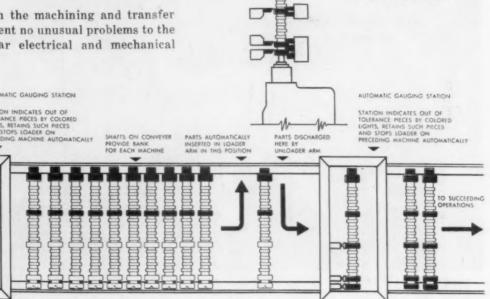
This solves a problem found in some closely automated machining lines. When one machine in a line stops, very often all machines must stop. The assembly engineered by Seneca provides a sufficient bank of work ahead of each lathe to eliminate this problem of "one down, all down."

Maintenance on the machining and transfer units should present no unusual problems to the customer's regular electrical and mechanical maintenance staff. All machining, gaging and transfer motions are actuated by electrical, mechanical and compressed air devices. Hydraulic controls or electronic components are not utilized in these automated units.

Either lathe in the assembly can be quickly switched from automatic to manual operation. The trolley-type work loader and unloader will not interefere with manual machining or be in the way of an operator making tool changes. Traveling above the lathe from tailstock position to machining position, the trolley carriage and work-holding cradles are well out of the operator's way.

At 100 pct efficiency, production rate of the automated units will be 112 camshafts per hour, completely turned and gaged. Based on preproduction estimates, floor-to-floor time in each lathe operation will be 0.533 minutes. Total machining time will account for 0.313 minutes in each lathe. Rapid traverse time is 0.080 minutes and in-and-out handling time for each camshaft is 0.140 minutes.

OPERATION NO 2



## Low-Cost Alloys

## Offer Good Heat Resistance

Part II

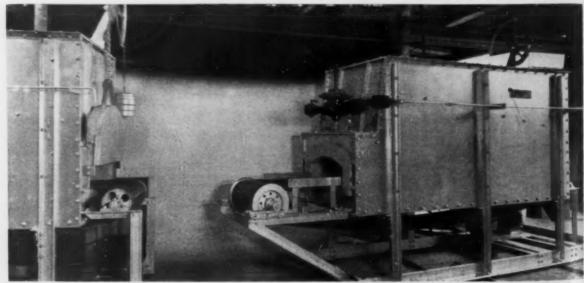
- Five relatively low-cost alloys can replace some of the more expensive and harder-to-get heat-resistant alloys . . . Knowledge of their properties and proper selection can save time and money, and aid in meeting many specific service requirements . . . RA-330 has been used successfully for many heat-resisting applications.
- Alloy 309, while not suitable for cyclic heating and cooling, does give excellent service at a constant elevated temperature... Carbide and sigma phase problems with Type 310 have been minimized by limiting carbon and silicon content... For lightly stressed parts, alloys 430 and 446 resist excessive scaling at temperatures up to 1550° and 2000°F, respectively.
- ♦ MUCH ATTENTION has been given to highly alloyed materials which offer high strength at elevated temperatures. However, many of these alloys are either too expensive, or difficult to fabricate. To promote better understanding of the merits of lower-cost and more easily obtainable heat-resistant alloys, and to promote their use, Rolled Alloys, Inc., De-

By R. W. Boring Vice President, Sales Rolled Alloys, Inc., Detroit

troit, sponsored a panel meeting for fabricators of such alloys. Knowledge of the physical, chemical and metallurgical properties will aid in proper selection, saving time and money.

Data on alloys 309 and 310 show that these alloys have higher expansion rates than RA-330 and, therefore, are not as suitable for cyclic heating and cooling. Type 310 has fair resistance to thermal shock. Alloy 309 is not recommended for such applications since it is inclined to "pop" its protective scale and thus continuously expose bare metal to the corrosive environment. Type 309 is an excellent alloy for parts that normally operate at a constant temperature.

Alloys 310 and 309 may become embrittled by sigma phase when operated in the critical temperature range of 1100° to 1500°F, although this problem is minimized by careful balance of nickel chromium, silicon and carbon. Carbide



TYPE 310 ALLOY fulfills service requirements for continuous furnace conveyor belt. It has

high creep strength, resistance to oxidation and sulfur, and cyclic heating and cooling.

### PHYSICAL AND MECHANICAL PROPERTIES

#### **Type 309**

position: 0.20 max. C, 2.00 max. Mn, 1.00 max. SI, 22.00-24.90 Cr. 12.00-15.00 NI

0.29 lb per cu in. effetent of Expansion: 32° to 1800° F, 11.5 x 10<sup>-6</sup> in. per in. per ° F m Censtant Temocrature Without Excessive Scaling: 2000° F Point Range: 2550° to 2890° F

#### Average Mechanical Properties at Room Temperature:

Tensile Strength, nel Yield Strength, sel Elongation, nct in 2 in Hardness, Rb		45,000		Annealed I 95,000 40,000 48	
Average Mechanical Prope	rties of Ba	rs at Elev	ated Temp	eratures:	
	1200° F	1400° F	1600° F	1800° F	2000° F
Tensile Strength, pei	52,000			13,000	7900
Vield Strength, pai Elongation, pct in 2 in, Reduction of Area, pct	32,000 37 45	27,000 40 42	20,000 50 50	65 70	77 75
Strees Rupture:					
		1200° F	1400° F	1800° F	1800° F
Load to Rupture in 1000 hi Load to Rupture in 10,000		20,000 14,000	8000 4000	3200 1500	1000 800
Creep Strength:					
		1200° F	1300° F	1400° F	1500° F
1 pct in 10,000 hr, psi		7000 4500	5000	2500	1000

#### Type 310

Composition: 0.25 max. C, 2.00 max. Mn, 1.50 max. Si, 24.00-26.00 Cr 19.00-22.00 Ni Density: 0.29 lb per cu in. Mean Coefficient of Expansion: 32° to 1800° F, 10.6 x 10<sup>-6</sup> in. per in. per ° F Maximum Constant Temporature Without Excessive Scaling: 2000° F Melting Point Range: 2500° to 2650° F

#### Average Mechanical Properties at Room Temperature:

			d Sheet		
		and	Strip	Anneal	ed Bars
Teneile Strength, pai Yield Strength, pai Elongation, pet in 2 in Hardness, Rb.		45,000		95,000 45,000 50	
ranunus, ra			80		89
Average Mechanical Prope	rties of Ba	re at Elev	ated Temp	eratures:	
	1200° F	1400° F	1600° F	1800° F	2000° F
Teneile Strength, pel Yield Strengt9, pel Elongation, pct in 2 in Reduction of Aréa, pct	57,000 22,000 32 45	42,000 18,000 30 40	27,000 18,000 32 37	17,000 38 40	10,000 50 50
Stress Rupture:		1200° F	1400° F	1600° F	1800° F
Lead to Rupture in 1000 h Lead to Rupture in 10,000	hr, pai	14,000 9000	5100 4000	2400 1500	2000 800
Creep Strength:		1200° F	1300° F	1400° F	1500° F
1					

socition: 8,12 max, C, 1.00 max, Mn, 1.00 max, Si, 14.00–18.00 Cr sity: 0.28 tb per cu in. In Coefficient of Expansion: 32° to 1800° F, 8,9 x 10<sup>-4</sup> in. per in. ner ° F imum Constant Temperature Without Excessive Scaling: 1850° F ting Peint Range: 2600° to 2750° F

Average Mechanical Properties at Hoom				
A		d Sheet Strip	Annesi	ed Bars
Tensile Strength, pai	75, 45,	000 000 25 00	75, 45,	
Average Mechanical Properties of Bars at	Elev	ated Temp	eratures:	
		1200° F	1400° F	1600° F
Tensile Strength, pel. Yield Strength, pel. Elongation, pet in 2 in. Reduction of Area, pet		22,000 12,000 50 95	10,000 6000 70 98	4000 1000
Creep Strength:				
1 pct in 10,000 hr, pai 1 pct in 100,000 hr, pai		1200° F 2000 1500	1300° F 1000 800	1400° F 800 500

#### **Type 446**

Composition: 0.35 max. C, 1.00 max. Mn, 1.00 max. Si, 23.00-27.00 Cr Density: 0.27 ib per cu in. Mean Coefficient of Expansion: 32° to 1500° F, 6.7 x 10<sup>-6</sup> in. per in. per ° Maximum Constant Temperature Without Excessive Scaling: 2000° F Melting Point Range: 2600° to 2750° F

Average Mechanical Properties at Hoo			
	Annealed Sheet and Strip	Anneal	ed Bare
Tensile Strength, pai	80,000 50,000 20 83	80,000 50,000 25 85	
Average Mechanical Properties of Bars	at Elevated Tem	peratures:	
	1200° F	1400° F	1600° F
Tensile Strength, pai	13,000	12,000 5000 88 95	7000 3000 98
Stress Rupture:			
	1200° F	1400° F	1600° F
Load to Rupture in 1000 hr, psi Load to Rupture in 10,000 hr, psi	4000 2000	2000 1000	1000 500
Creep Strength:			
		1200° F	1300° F
1 pet in 10,000 hr, psi	• • • • • • • • • • • • • • • •		500 300



FURNACE MUFFLE fabricated from Type 309 alloy gives good service at constant elevated

temperature. It is used for annealing spring steel at an operating temperature of 1450°F.

E

precipitation may also occur in some instances.

Embrittlement is not always a critical problem since many parts operating in the intermediate temperature range are not subjected to thermal shock or impact, and are not highly stressed. For highly stressed parts, such as fan blades, embrittlement in the 24-pct Cr, 12-pct Ni alloy can be further minimized through the use of Type 309-S wherein carbon is limited to 0.08 pct maximum.

The aircraft industry, a large user of Type 310, has minimized both carbide and sigma phase problems by adopting a specification limiting carbon and silicon to 0.08 and 0.75 pct maximum, respectively. This alloy is considered superior to high-nickel nonferrous alloys used for some jet engine parts.

Straight-chrome ferritic stainless steels, such as AISI 430 and 446, are characterized by good oxidation resistance but relatively low strength at elevated temperatures. Type 430, containing 17 pct Cr, offers resistance to excessive scaling at temperatures up to 1550°F. Type 446, containing 27 pct Cr, can be used successfully at temperatures up to 2000°F.

#### These alloys resist scaling

Both alloys have a low coefficient of expansion which results in minimum distortion due to heating and cooling. They are susceptible to grain growth. As a result, they possess relatively low room-temperature ductility after long service at elevated temperatures. Properties at service temperatures appear unaffected. Due to the absence of nickel, they are not susceptible to attack by sulfurous atmospheres.

Data on AISI 430 and 446 indicate that the strength of these materials is reduced rapidly with increasing temperatures, with Type 446



HEAT NUMBERS and analyses marked on each sheet in storage rack of fabricating plant not only identifies sheets, but simplifies selection of materials for heat-resisting applications.

offering higher tensile but lower creep strength than Type 430. For applications involving lightly stressed parts requiring a high degree of resistance to scaling, these ferritic straightchrome steels offer economical performance.

Applications involving heat-resisting metals are governed primarily by one or more of the following factors: tensile, yield, creep, rupture, fatigue or impact strength, resistance to thermal shock, oxidation, carburization or other corrosion, cast and availability. No alloy is superior with respect to all these properties. For most applications, this is not necessary.

#### Pick the right alloy

Successful solution to the majority of heatresisting problems is dependent upon the recognition of which properties are required, and the selection of the alloy which best fulfills these requirements. Users of high-temperature equipment measure the performance of an alloy in terms of cost per hour of service. The combination of good design, fabrication and material which yields the lowest cost per hour is generally the most satisfactory.

By comparison RA-330 offers excellent resistance to thermal shock such as encountered in oil quenching from temperatures above 1500°F, combined with greatest strength for load carrying ability. It also possesses maximum resistance to absorption of carbon and nitrogen through the temperature range usually encountered, and oxidation resistance up to 1950°F.

Type 310 is suitable for applications involving moderate thermal shock and adequately resists corrosion from neutral or midly carburizing atmospheres. In the presence of sulfur, it is preferred for carburizing conditions over the higher-nickel alloys. It offers excellent characteristics and resistance to scaling up to 2000°F.

Type 309 offers excellent strength and resistance to oxidation at temperatures to 2000°F. It is particularly suited for parts which operate at relatively constant temperature or receive very moderate cyclic heating and cooling. It does not resist absorption of carbon or nitrogen.

#### Types 430 and 446 resist oxidation

Types 430 and 446 are good for applications requiring oxidation resistance up to 1550° and 2000°F, respectively, with low stress. High strength requirements indicate the need for one of the austenitic alloys. Because of their low coefficients of expansion, these alloys resist distortion from heating and cooling.

Small cracks should be repaired as soon as they occur in service, and care should be exercised in handling carburizing equipment to avoid impact or deformation. Life of equipment operating in the intermediate temperature range can be increased by periodic annealing.

## **How to Press Form Titanium Parts**





By Paul Maynard Andrew Eshman
Group Leader Research Engineer
North American Aviation, Inc.
Columbus, Ohio

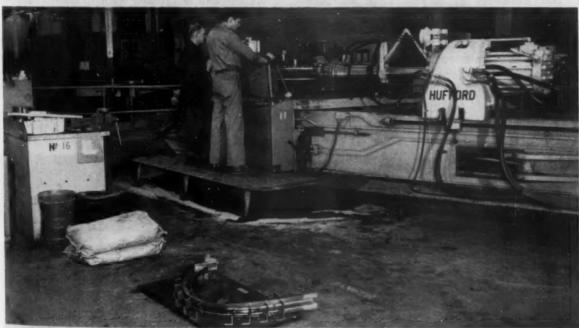
- Rubber pad, brake, stretch and drop hammer forming have been used to produce 135 titanium production parts at North American Aviation's Columbus plant... Preparation of work is critical... Edges of blanks must be deburred and preferably polished to prevent notch sensitivity failures... Shrink forming takes special hydraulic press methods to reduce wrinkling.
- ◆ Stretch forming takes slow, careful handling . . . Some parts have been switched from hydraulic presses to drop hammers with impressive man-hour savings . . . Cleaning parts after stress relief annealing helps inspection, provides good welding surface.

♦ FORMING TITANIUM PARTS in 135 shapes and sizes to meet tight specification and production schedules is the challenge met by North American Aviation, Inc., Columbus, Ohio. A standing titanium committee pools production, engineering and tool design knowhow to solve fabricating problems as they arise.

Titanium components in the firm's FJ-2 jet fighter vary in weight from a hundredth of a

pound to 4.5 lb. Both commercially pure metal and titanium alloys are used. Parts are fabricated by four basic methods: Rubber pad forming, brake, stretch forming and drop hammer.

Shearing, die blanking, nibbling and sawing are all satisfactory methods of preparing blanks for forming. Majority of blanks are cut on a band saw with a lineal speed of at least 4500 fpm. There is no difficulty in cutting titanium



STRETCH FORMING machine at North American. Note stretch-formed part in foreground.

#### Rubber pad forming is used on many parts . . . special care is needed for shrink-forming . . .

so long as the feed of the blade is kept positive.

Because of titanium's notch sensitivity, it is important that burrs be removed. Blank edges should be rounded and polished before forming. The notch effect, most noticeable on brake and stretch formed parts, is also evident on parts formed in rubber pad presses. Draw filing removes rough burrs, and final polish is obtained with 240 grit emery cloth.

Rubber pad forming is used when the part is predominantly flat with flanges, beads and lightening holes. At North American this is usually done on a 2500-ton press developing a bed pressure of 1500 psi.

A press-contained rubber pad (45-55 Shore hardness and about 8 in. thick) is located over the block and titanium blank. As the press ram is lowered, the rubber pad envelops the block, and the sheetmetal blank conforms to block contuor. The part can be formed cold with intermediate anneals if its contour is not too severe and the gage is light.

If part contour is severe, or includes shrink flanges, and the gage is 0.050 in. or more, elevated temperature forming is usually required. The form block is heated from 800° to 1000°F and the blank covered with powdered asbestos. An extra pad of special heat resistant hard rubber (70-80 Shore) is placed over the powdered blank. The extra rubber pad provides additional rigidity for forming and protects the presscontained rubber pad from the hot form block.

Hot handwork is necessary on all pressformed parts to remove shrink flange wrinkles, align flanges and stretch or shrink the part to contour. Press forming pressure is occasionally reduced to obtain rounded wrinkles on the shrink flange as sharp wrinkles usually crack with subsequent handwork. Temperatures of 600° to 700°F are ample for hot handwork. At present oxyacetylene torches are used. This method is not recommended and is being replaced by heated surface plates as well as heated stretcher and shrinker dies.

Press form blocks require pressure plates 1 in. thick and dies 3 in. thick for heat retention. Springback allowances for mold line flanges range from 7° to 14°. Springback varies with gage, unit forming pressure, and temperature. Distortion of form blocks and the galling action of titanium at elevated temperatures has required use of hot work tool steels for dies.

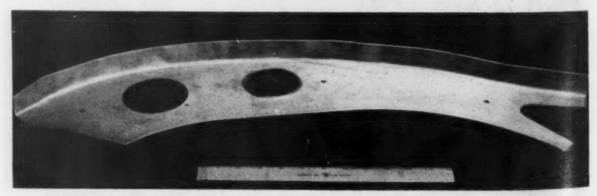
The rubber pad process is satisfactory when the forming operation involves either a straight bend, a stretching of the metal, or a combination of the two, because there is no tendency to wrinkle. But shrink forming, as is necessary with a convex flange or drawn shape, tends to cause wrinkling. This is because a retainer is not used to regulate metal flow in the blank preventing wrinkles before forming pressure is applied. Also, low forming pressures do not give the rubber pad sufficient rigidity to prevent wrinkling. Shrink-formed wrinkles are very difficult to remove.

#### Other methods cut wrinkling

Marforming uses a rubber pad, but also employs a blank-holder plate actuated hydraulically to regulate holding pressure on the blank. This pressure control reduces wrinkling and springback, enabling deeper, more precise draws. Experience with Marforming of titanium has been limited, but sample parts made on aluminum forming dies look promising.

Limited forming of titanium has also been done on a Wheelon-type press rated at 5000 psi forming pressure. This equipment employs a bag or fluid cell secured in the top of the press. As the bag is inflated with hydraulic fluid, it moves a rubber work pad down over the blank and form block to create equal pressure on the top and sides of the block. The higher, equalized pressure is particularly suitable for heavier gages of titanium, 0.073 in. and up. It has reduced wrinkling and produced better contoured flanges.

Angles, zee sections, hat sections and chan-



RUBBER PAD forming produces many flat titanium parts with flanges, similar to this one.



DROP HAMMER forming has replaced some hydraulic press operations at considerable savings.

nels are brake formed, utilizing a trough-like female die and a round-nosed male punch. Until recently, all brake operations on titanium sheet were performed at room temperature, but this method produced a high percentage of scrap. Two steps eliminated practically all scrap loss. First, bend radius of all brake-formed alloy parts was increased from a minimum of 3 to 3.5 times. Also, an electric furnace was installed to preheat the sheet to 800° to 900°F.

Chicago press brakes with 8 to 14 ft bed lengths are used. Whenever possible, female dies are selected with die openings of four times the punch radius, plus two times the material thickness.

Stretch forming at room temperature is used primarily to bend angles, hat sections, zee sections and channels to fit contours of the airplane fuselage. A Hufford hydraulic stretching machine is used. Forming is done by gripping the work in knurled jaws, loading until plastic deformation begins and then wrapping the part around a female die as slowly as possible. Edges of the material gripped in the jaws must be

polished, and it is believed helpful to polish the entire length.

Some difficulties in stretch forming titanium are:

1. Failures caused by slight material defects or flaws. Continued improvement of material quality is reducing this problem.

2. Necking of the upstanding flange, causing a reduction in width.

The crystal structure of titanium indicates it should be formed slowly; but some parts have been switched from hydraulic press to the drop hammer method with considerable savings in man hours.

Zinc-base alloys have been used for both drop hammer dies, but usual practice is to use a zinc-base female die and a copper-coated lead punch. The female die is heated to 250° to 300°F to reduce chill effect on the blank, which has also been heated to 800° to 1000°F. Blocks of rubber are used when necessary to progressively form the part. Their use is omitted whenever possible since the rubber melts and presents a difficult cleaning problem.

No production parts of titanium have been

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formed on the punch press. An experimental die made to operate at 800°F has been tried, but a die tolerance problem at elevated temperatures and the galling tendency of titanium indicate this method would only be feasible for large production runs.

Titanium sheet as received is in the annealed condition. Heat treatment is used only to relieve residual stresses introduced by cold-working. This consists of heating at 1000°F for 20-30 min, followed by air cooling, and is done on all formed parts prior to assembly in the airframe.

#### Cleaning aids inspection

All fabricated parts that have a discolored or oxidized surface as a result of stress relieving or hot forming are cleaned. Parts are immersed in a solution of 2 pct hydrofluoric acid, 47 pct nitric acid and 51 pct tap water, just long enough to remove the oxide layer. A 20 min immersion is usually ample. After cleaning, parts are washed in tap water and dried by air blast. Cleaning aids inspection of parts for cracks, and the etched surface is ideal for resistance welding operations on commercial sheet.

Fusion welding of commercially-pure titanium is possible, but it has not been used on production parts. Welding has been limited to spot welding of pure titanium. Single phase AC machines have proved satisfactory.

Spot welds in pure titanium show good mechanical properties. Shear strengths average 40 to 50 lb for each 0.001 in. of thickness, compared to 25 to 45 lb per 0.001 in. of thickness for 18-8 stainless steel. Weld nugget hardness

is approximately 15 to 30 pct higher than that of the base metal. This relationship is approximately 10 pct higher than that of spot welded 18-8 stainless steel.

There is a hardening effect in the weld fusion zone, but spot weld shear tests still pull buttons in sheet thicknesses up to 0.035 in. This would indicate that neither the fusion zone nor the heat-affected zone could be considered brittle.

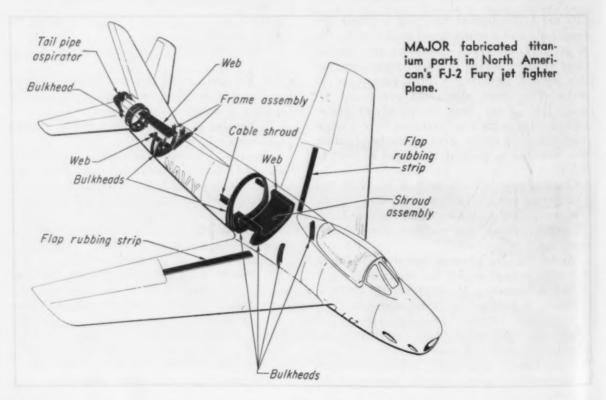
Welding schedules are similar to those for 18-8 stainless steel, except that tip pressures can be reduced as much as 50 pct in some cases.

To join titanium, hot coin dimpling is used for countersunk fasteners. The drilled hole must be thoroughly deburred prior to dimpling. A Chicago Pneumatic 450 EA coin dimpler with heated dies is used. Dies are heated to 750°F in order to obtain a temperature of 600°F in the sheet with a 2 sec dwell time.

#### Tests show no shear cracks

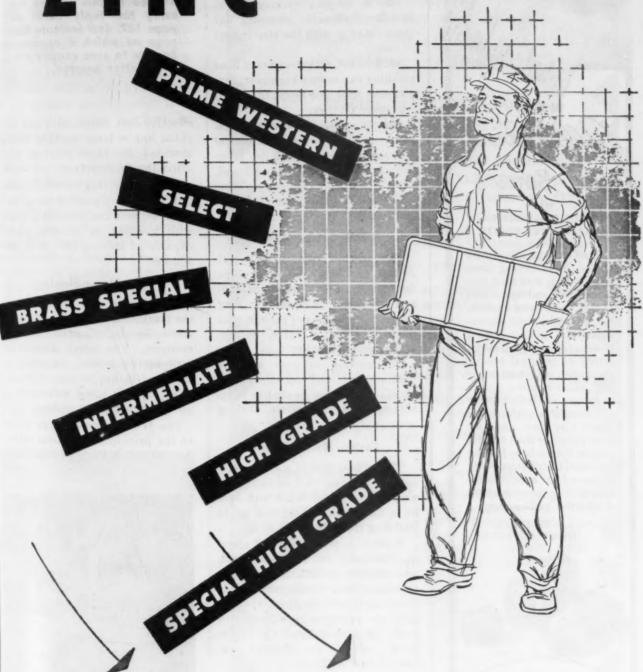
Pressure capacity of the standard machine can be increased for heavy gages by using a special cam (15,000 to 20,000 lb). At temperatures below 600°F, satisfactory dimples cannot be formed even when the machine's full load capacity is used. Above 600°F, well-defined dimples for 3/16 in. fasteners are easily formed in sheets as thick as 0.100 in.

So far, tests have failed to show evidence of internal shear cracks such as may be encountered in 75S-T6 aluminum. Dimples in titanium cannot be reworked to a larger size as is possible with aluminum. Monel rivets are used to join any combination of titanium or 18-8 stainless steel, and cadmium plated steel rivets are used when aluminum is included in the joint.



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## **Technical Briefs**

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> Report No. E 5576, March 17, 1953.



## **Maintenance:**

## Cleaning costs cut with mechanical sweepers.

Cost of keeping working spaces and floors clean by sweeping has risen steadily with the rise in cost of labor.

Studies indicate mechanical floor cleaning can reduce such cost, cuts cleaning time and keeps the working space cleaner.

A modern, floor type suction machine or a motorless mechanical floor sweeper, adapted to large floor areas can, at walking speed, save up to 80 pct of cleaning costs by increasing the area each man can handle.

#### **Handles Many Wastes**

The suction sweeper will pick up lint, dust, dry sand, wood chips, flour and sawdust, wood shavings and small chunks of wood, string paper, cloth, scraps of rubber, mice flakes, iron oxide flakes, plastice scraps and grindings, tags.

The suction sweeper will not pick up wet, oily or sticky substances, hardware or similar metal objects, spherical objects, stiff or excessively large articles.

#### Faster, More Efficient

The wide-orifice of a heavy duty suction cleaner, 31.5 sq in., keeps properties free of trash and dust on a 22-in. path at speeds up to 20,000 sq ft per hour.

It offers a new concept of speed and efficiency in collecting dust, and ordinary traffic litter from factory floors and warehouses. Aside from elaborate built-in systems and air conditioning there has been, until recently, little equipment available for effective control of dust of floors.

#### **Equipment Compared**

Powerful industrial vacuum cleaners are effective, though slower for use on large floor areas. Mechanical floor sweepers are fast and efficient, but dust is a problem. To fill this need for high speed,

## IF YOU WANT

You may secure additional information on any item briefed in this section by using the reply card on page 107. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

effective dust collection, a new machine has a large suction nozzle mounted in fixed position just above the floor surface.

The wide orifice permits collection of large pieces of scrap and litter without clogging. It is made with gasoline or electric power capable of moving 860 cu ft per minute.

#### Air Moves Slowly

Cleaning by air movements is the machine's only similarity with conventional industrial vacuum cleaners. The latter depend on high suction power (measured in terms of inches of waterlift) derived by high speed movement of air through narrow orifices.

The new suction sweeper works on the principle of volume rather than speed. It moves a large mass of air (relatively slowly) through



Cleans wide path ...

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mass rough a wide open orifice. This results in a low waterlift rating but an extremely high rating in terms of cubic feet per minute.

#### Motorless Sweeper

The motorless sweeper previously referred to is as a substantial time-saving and labor-saving aid in sweeping floors of freight cars, shipping docks, and plant areas. The sweeper operates mechanically with no engine or motor to complicate performance. It is simply rolled along the floor by the operator.

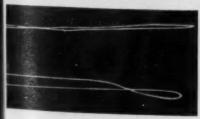
As the wheels rotate, a brush inside the sweeper revolves in the opposite direction, whisking dirt, trash, dust, and debris forward into a detachable aluminum hopper that one man can easily empty with one hand. The amount of pushing effort required ranges between 9 and 11 pounds, depending on model and attachments.

Absence of any motor or adjustments makes it easy for anyone to operate the sweeper without prior instruction.

Sweeping paths range from 20 to 40 in. wide. Sweeping speeds, as shown by time studies, range from 15,000 to 22,000 sq ft an hour.



Push broom motions . . .



. . Easier by machine

March 11, 1954

N AGE

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Your Inspection Invited

#### TYPICAL OPERATIONS

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- . CONTOUR CUTTING
- PUNCH PRESSING
- . FINISHING
- . STAMPING . DRILLING
- . BRAKING . FORMING
- . WELDING . GRINDING
- . RIVETING
- WAREHOUSE &
   SHIPPING FACILITIES

#### TYPICAL PRODUCTS

- . BREECHINGS AND CASINGS
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#### -Technical Briefs

### Materials:

Develop rubber base sealer in strip form.

An extruded rubber base sealer with 100 pct solids content that expands uniformly over the entire length of the sealer bead when heat cured has been developed by the Adhesives and Coatings Div., Minnesota Mining & Mfg. Co., Detroit.

Applied in the form of a flexible rubber strip, the sealer cures and expands when heated to form a positive, uniform, gasket-like material between metal surfaces. It seals out water, dust and dirt and acts as a cushion to prevent rattles and squeaks.

#### Several Advantages

The expanding extruded sealer has several advantages:

- It can be used to seal seams which are not uniform in width.
   When expanded, the sealer fills the entire seam.
- 2. Special flow or pressure application equipment is not needed.
- 3. Uniform beads of sealer are applied quickly and parts are processed immediately. No time is required for solvent evaporation
- 4. Large gaps can be filled without the sealer flowing out from behind the metal.
- Excess sealant does not flow out when parts are drawn up tight.

#### Controlled Expansion

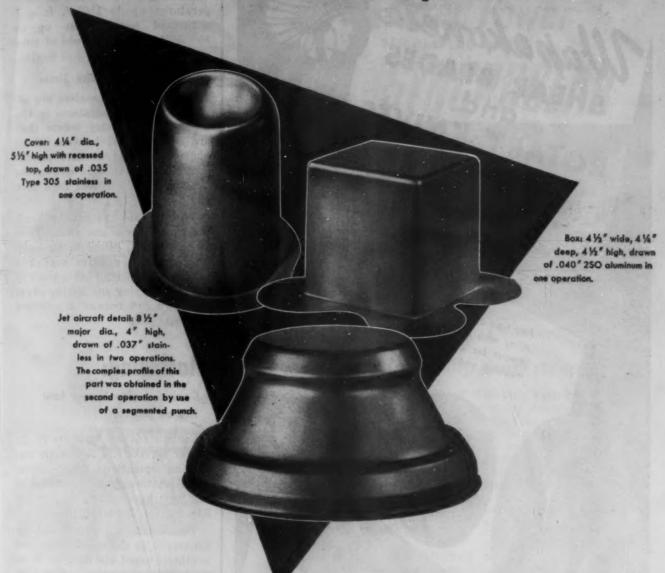
Amount of volume increase depends on the time and temperature used in the curing process. Forty minutes at 250° F will produce a swell of 70 to 80 pct. A 15 minute cure at 350° F will cause the sealer to swell nearly 125 pct.

Once cured, the sealer remains flexible to about -20° F and pro-

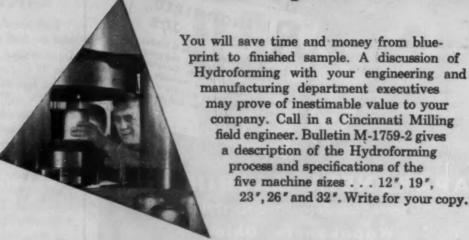


Sealer expands to fill ...

## DRAW cups, cubes and complex contours...



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Hydroform

THE CINCINNATI MILLING MACHINE CO. CINCINNATI 9, ONIO, U.S.A.

vides long term service at temperatures up to 150° F. It will withstand temperatures up to 300° F for short periods of time without deteriorating and flowing.

#### Cures While Paint Dries

Heat expanding sealers are already finding applications in the automotive industry where they are used to seal between wheel housings and trunk floor panels. Another application is between the quarter panel and rear deck floor pan.

Pressed into the gap by hand, the sealer cures and swells from 70 to 125 pct, filling in all voids and giving a positive seal. The curing of the sealer takes place in the paint drying and baking ovens and does not require a separate heating cycle.

## **Machining:**

Carbides give longer saw life on plastics.

Carbide cutting tools are giving longer service life on plastic machining operations than conventional cutting tools, according to the Switchgear Dept. of General Electric Co., Philadelphia.

Tough cutting problems are encountered in the wood, fibre, and synthetic based plastics. On %-in. thick Celifron plastic, using Carboloy carbide-tipped saws, more than 25,000 ft can be cut before the saw teeth have to be sharpened.

#### Life On 3/4-in, Stock

The plastic cutting operation is run at 3600 rpm with a 14 or 16in. circular saw. The 14-in. saw has 90 Carboloy carbide teeth, the 16-in. has 96.

On ¾-in. material, over 10,000 ft can be run with carbides. This applies to most plastic compounds. On heavy compounds like 113, the carbide cuts 4000 ft. But when using a new machine that also cuts aluminum, the department averages over 10,000 feet per grind with carbides.

Turn Page



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Clean, bright, accurate, strong — that's the story of Ritco Drop Forgings. We produce parts to your blueprint in steel or non-ferrous metals, in weights from ¼ lb. to 15 lbs.

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March 11, 1954

## Geared Power

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DON'T go to the expense of installing a gear box with extra coupling and guards to rig up slow speed for a motor. Install the U.S. Syncrogear motor and avoid extra contraptions. You'll simplify your power hookup, save space, eliminate hazards and give your driven machine the most efficient power. The U.S. Syncrogear motor was one of the first complete integral power units, introduced 22 years ago. It's backed by experience, tested and proved performance and engineering "know-how" that only U.S. MOTORS can offer to those seeking the most dependable geared motor power.

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Normalized castings
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Neat, streamline
appearance
Drip-proof surface

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### **Production:**

Fixtures, loading devices speed rocker-arm output.

Production of rocker arms has been speeded through use of four individual fixtures and loading mechanisms in one installation using a Heald 221 Bore-Matic.

The unit is designed to allow the operator to load four stations during boring operations on previously loaded parts. This eliminates an

increase in cycle time for loading operation.

#### Air Hammer Seats Parts

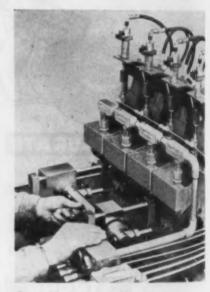
The cycle is as follows: Operator fixes rocker arms on the four stake type loading arms and swings arms up into fixture. As the fixture clamp button is actuated an air hammer arrangement seats parts in fixture prior to clamping.

Operator retracts loading stakes from fixture, contacting microswitch which starts table left. Following boring operation the tools are automatically retracted and the table runs out at rapid traverse, work is automatically unclamped and ejected onto conveyor.

#### **Production Rate High**

Rocker arms are malleable iron 16-23. Stock removal is 0.015 in. on diameter. Boring heads are running at 1750 rpm with a boring lead of 0.004 in. Net production at 75 pct efficiency is over 600 pieces per hour.

Use of the conveyor has effectively speeded movement of parts out of the machine. Parts drop onto the conveyor following the boring operation.



Loading rocker arms . . .



... Speed up boring



MACHINE COMPANY
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#### KEOKUK

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Keokuk Silvery . . . the superior form of silicon introduction for steel plants and foundries . . . available in 60 and 30 lb. pigs and 12½ lb. piglets . . . in regular or alloy analysis. Keokuk also manufactures high silicon metal.

## ELECTRO-METAL COMPANY

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There's just no match for Keokuk Silvery Pig Iron to control quality and costs. Due to its exact, uniform analysis, Keokuk assures less waste resulting in greater economy. Car for car, pig for pig, its uniformity never varies. Charge Keokuk by magnet or count!

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N AGE



## Production costs cut with powder metal bearings.

A switch from machined bearings to sintered bronze oil impregnated bearings has helped one company cut production costs on a displacement type meter. Nineteen powder metal parts and now used in the displacement type gas meter made by American Meter Co., Erie, Pa.

A bronze type alloy consisting of approximately 90 pct copper, 10 pct tin is used. Zinc stearate is used as a lubricant in compacting.

Majority of the 19 parts are bearings or bushings used at points where friction is encountered during the recording of air or gas flow through the meter.

#### Must Resist Corrosion

Friction loss has to be at an absolute minimum if the flow of all gas is to be recorded accurately and smoothly. Parts must operate smoothly, withstanding considerable wear under severe duty, and also be able to resist corrosion under all conditions.

In addition to excellent, permanent lubricating qualities, when initially impregnated with oil, the physical characteristics of this alloy more than meet service requirements.

Experience of other manufacturers on changeovers to sintered parts, for comparable applications, indicated that production costs per part would be considerably lower. This was verified under production conditions at American Meter.

#### Methods Compared

One bushing had been previously turned and bored from brass bar stock on an automatic screw machine. Production averaged about 230 pieces per hour by this method with rejects often as high as 50 pct due to dimensional inaccuracies.

The same part, of sintered bronze powder is now being turned

Turn Page



Here's the finish that combines corrosion resistance and paint adherence with extreme ease of application. It can be welded or soldered with no difficulty and presents no problem in "patching" scratches, marks or scraped sections. Here's what you can do with Iridite:

ON ZINC AND CADMIUM you can get highly corrosion resistant finishes to meet any military or civilian specifications and ranging in appearance from olive drab through sparkling bright and dyed colors.

ON COPPER... Iridite brightens copper, keeps it tarnishfree; also lets you drastically cut the cost of copperchrome plating by reducing the need for buffing.

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ON MAGNESIUM Iridite provides a highly protective film in deepening shades of brown. No boiling, elaborate cleaning or long immersions.

AND IRIDITE IS EASY TO APPLY. Goes on at room temperature by dip, brush or spray. No electrolysis. No special equipment. No exhausts. No specially trained operators. Single dip for basic coatings. Double dip for dye colors. The protective Iridite coating is not a superimposed film, cannot flake, chip or peel.

WANT TO KNOW MORE? We'll gladly troat samples or send you complete data. Write direct or call in your Iridite Field Engineer. He's listed under "Plating Supplies" in your classified phone book.



## **AUTOMATION** at work



18,240 operations — 80 automobile transmission cases every hour! That adds up to quite a day's work, but it's no problem for this transfer machine built by the Baush Machine Tool Company of Springfield, Massachusetts. Unusual sectional design permits rapid retooling, keeps work handling to a minimum, and speeds production in many of America's largest automotive plants.

To provide the strength and rigidity required by this complex, automatic machine, Baush engineers specified all-welded steel bases fabricated by Acme Welding. Beside being stronger these Acme weldments are lighter and make possible the incorporation of many exclusive design features. Perhaps these advantages of Acme weldments are important to your product... whatever your requirements, why not call on Acme today.

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March 11, 1954

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#### Furnace centrally located for close control..

out at a rate of 4000 per hour by the briquetting press and 12,000 per hour by the furnace, under full production, with practically no rejects.

To carry out the sintering operation on a production basis, a gas-fired muffle furnace with cooling chamber and an MAX ammonia dissociating generator were purchased from Surface Combustion Corp., Toledo, Ohio. This generator produces an AX prepared atmosphere, 75 pct hydrogen, 25 pct nitrogen, that surrounds the work being heated and cooled in the furnace muffle.

The furnace, MAX generator,

mixing drums, compacting and coining or sizing presses, oil impregnating equipment and other sintering facilities are located in an enclosed area.

#### Mixing Requires Care

Furnace and generator are centrally located with the mixing drums and presses, positioned around it in order of their steps in the production process from mixing to oil impregnating. This arrangement confines these precision operations to a small area where all steps can be kept under close control.

Mixing of the copper and tin powders and zinc stearate has to be precise and accurate. It is carried out in a drum type tumbler containing a free turning cylindrical screen. After 10 minutes the screen is removed and the mixture is agitated under drying lamps for one hour.

#### Measured Automatically

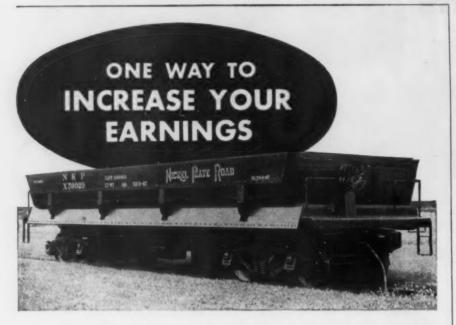
Briquettes are formed by matching dies in a 4-ton mechanical press. Powder is measured automatically from a hopper and briquettes pressed out at a rapid rate. One of the briquettes, measuring 0.173 in. thick and requiring about 49-52 centigrams of powder, is turned out at a rate of 4,000 per hour.

Rate and amount of powder will vary according to depth and diameter of the part. Several sets of dies are still turning out good work after a million and a half briquettes.

#### To 1500 Parts Per Tray

Sintering is carried out at 1550°F in the gas-fired muffle furnace. For the majority of production, exactly 1000 parts are loaded on each stainless steel tray measuring 11½ x 12 inches.

The different types of parts sintered vary from 700-1500 per tray depending on size. A counting device on the briquetting press insures accurate loading of each tray. The parts must not overlap but lay flat in a single layer. Net weight of each load will range from 1 to 13 lb per 1000 parts.



## Higher Ratio: 'Payload to Dead Weight' with Differential Air Dump Cars

Differential design and construction skillfully combine greatest strength with lightest possible weight. Saves motive power, fuel, maintenance. Dead weight is an enemy of economy. Differential makes the difference! But that isn't all!

The automatic, either side dumping design — by **air** power is safer, faster — means still more economy. No matter what loose material there's 'more payload to dead weight' — more all around economy and lasting satisfaction in Differential Air Dump Cars.

Differential Products Include: Air Dump Cars, Locomotives, Mine Cars, Mine Supply Cars, Rock Larries, Mantrip Cars, Dumping Devices and Complete Haulage Systems.



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#### Technical Briefs.

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All sintering operations to date, on the 90-10 bronze alloy, require a 5 - minute loading interval. Loaded trays are brought directly from the briquetting press and stocked at one side of the furnace charge vestibule. A tray is placed on the small charge table and pushed into the vestibule every 5 minutes.

#### Loading and Unloading

A timer and bell, on the handy central control panel, signals these intervals. After pushing in a tray load, the operator resets the timer and proceeds to the discharge end of the furnace where he withdraws the last tray in line inside the water jacketed cooling chamber.

Since 10 trays can be accomodated in the furnace between charge and discharge doors, each tray load remains in the furnace and cooling zone for 50 minutes using the 5-minute push cycle.

#### Sizing Strengthens Parts

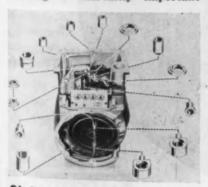
At the discharge end of the furnace, the trays are pulled out of the water jacketed zone, cool enough to handle, and ready for the next operation.

Sizing or coining, as it is sometimes called, is required in a 4-ton press in order to strengthen the part and also to overcome the slight growth resulting from heating at near melting temperature. Good design of parts allows for this dimensional change.

#### Oiling Important

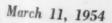
Dies in the sizing press are almost duplicates of those in the briquetting press.

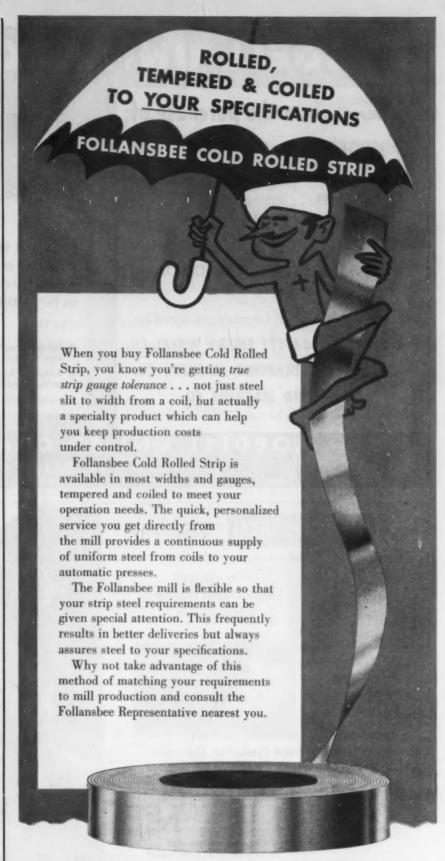
Oiling is extremely important



Sintered meter parts . . .

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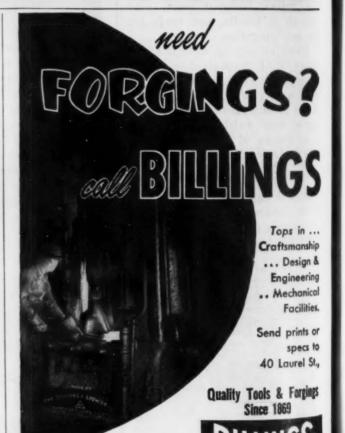


#### Mevercord Laboratory and Production Experience -PLUS Unexcelled Service - to Serve You Better!

Sometimes we are too prone to tell our friends about the spectacular achievements of Meyercord in solving those "impossible" decal transfer applications . . . like the new E-51 aircraft decals that resist up to 900 degree temperatures of jet engines, as well as the ravages of strong solvents and aircraft fuels. Specialized decal applications are a mighty important part of our business . . but we're still first and foremost in the business of supplying standard Meyercord nameplate and identification decals. Whether you make typewriters, appliances, electrical

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as this operation imparts to each bushing the highly critical lubricating properties for which it was produced. The parts are dumped into pans of special impregnating oil at 170°F for 2 to 3 hours. After draining for one hour they are ready for use.

Press fitting into the crank stands, arms, and other parts, is performed on oil-hydraulic presses on the production line.

#### **Need Close Furnace Control**

The prime requirements of a sintering furnace are uniformity of physical properties and of dimensions of the parts being processed. Both of these are of course a function of temperature and atmosphere.

Uniformity of heating and close control of atmosphere conditions are critical factors in the sintering of powdered metals. Since certain alloy powders expand on heating, it is a prime requisite that the furnace temperature be uniform at all times and production consistently duplicated.



#### ... Loading furnace

#### Tips on Cleaning Stainless

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When phosphoric acid or oxalic acid base cleaners are used to clean stainless steel equipment, the surfaces should first be thoroughly rinsed with water if chlorides are thought to be present.

Armco Research Laboratories have learned that a brown-colored etching occurs, which is caused by hydrochloric acid forming when chlorides and phosphoric or oxalic acid is mixed on the stainless steel surface.

Turn Page

## POWDER METALLURGY can duplicate this part for



### Don't cut parts-Cut Costs!

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When it comes to keeping production costs down, American industry turns more and more to powder metallurgy. For here are tough, accurate parts completely ready for assembly...that not only do the job more cheaply, but often better!

With identical machined parts, most of the cost goes into the expensive machining operation. The price of one machined part will buy up to six of the same parts in powdered metal!

Close tolerances, excellent wear-

ability, and controlled porosity are established Powdermet\* virtues. Special properties—such as self-lubrication, or unusual electrical characteristics—can also be achieved. Alloys are available exceeding the tensile strength of mild steel.

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A qualified Yale & Towne engineer is available to discuss the advantages and limitations of powdered metal parts—right in your own plant! He will show you how powder metallurgy may cut costs in your production operations. There is no obligation for this engineering counsel.

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NameTitle

March 11, 1954

### **Testing:**

Jet engine sucks air for wind tunnel tests.

Use of a jet engine to suck air has provided an economical method of testing aircraft engine inlet ducts and reduced the amount of wind tunnel testing required, at Chance Vought Aircraft, Dallas, Texas.

This novel jet engine use was conceived when the company wanted to test an inlet duct design and wanted quick data on its efficiency under static conditions.

#### Exhaust Outside

The test facility consists of a J-33 Allison jet engine loaned by the Navy, mounted in a 7-ft steel cube. The jet's exhaust nozzle is mounted outside the cube and the rest is encased in the building.

From the opposite wall a 30-ft steel diffuser extends into a protecting shed where the airscoop to be tested is mounted, complete with manometers and other test measurement equipment.

As the jet engine is turned up at high speeds it exhausts the air from its steel cubicle. Suction thus created results in air being sucked into the long tube through the plaster airscoop model.

#### Can Be Moved

The whole test facility is both portable and economical. It can be picked up and moved anywhere. The jet engine is mounted in a standard wheeled dolly for easy transfer or maintenance work. Outside of the engine, the facility was made of existing materials at CVA.

It is the successor to a blower unit powered by a 100-hp motor which first was used to test inlet ducts on the F4U Corsair. The need arose for greater capacity to check jet aircraft and guided missile airscoops without long technical delays and expense. So the power plant analysis section came up with the idea which led to the new test facility, with triple the capacity of the old blower unit.

#### Mount Airscoops

By mounting miniature airscoops or duct shapes in the mouth of the inlet tunnel, Chance Vought engineers can check distribution and loss at the engine inlet, or do such tasks as determine pressure loads on ducts for the structures section.

When the jet engine is operating at full rpm, the facility can generate a negative 5 psi vacuum in the cubicle. So that lower suctions can be created at the working end of the long tube, a screened by



Jet engine moves air ...

## Satisfactory Deburring in Noah's Time...

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When you use the right deburring compound in a tumbling setup, you not only cut the time required for the removal of burrs by incredible margins . . . but you get far more accurate results, with a tremendous reduction in rejects.

Magnus Deburring Compound virtually eliminates hand labor, yet keeps the metal removal right down to the burrs without affecting the pieces themselves.

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pass door permits the engine to operate at optimum compressor pressure ratio.

Instead of an exhaust nozzle on the jet engine, a diffuser was installed to increase the engine's ability to suck.

A screen box was mounted at the junction of the 30-ft tube and the steel cubicle to trap any pieces of plaster should the airscoop shatter during tests. It also would keep any dirt or other articles from being sucked accidentally into the engine.

The machine, weighing close to a million pounds, was designed and built by National Machinery Co. of Tiffin, Ohio. Eight railroad cars, four of them beefed up for the purpose, were needed to transport the machine to Louisville. The cars moved only by daylight, at speeds under 25 mph along a special route.

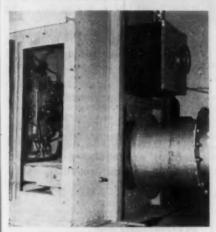
#### Cast In Sections

Frame of the machine was cast in three sections. They will be

joined by forged tie-in bars and rods that will become integral parts in the final assembly. The front of the machine measures 14 ft 11½ in., and the side 11 ft 9¼ in. It is 11 ft 8 in. high.

Main wear points have the strength and impact resistance to remain serviceable under the severest work loads. The machine has an improved friction slip clutch and a new disk type brake. It is powered by a 300 hp motor.

Turn Page



... For wind tunnel

## Forging:

Big 1 million lb machine to produce aircraft forgings.

Advanced design forgings for military and commercial aircraft will be produced on one of the world's largest forging machines, a 10-in. horizontal unit now being installed at Tube Turns, Louisville, Ky.



Big forging machine



In the past, lathes were generally bought as large and as heavy as possible to insure accuracy and sufficient power. Now, with accurate, low-cost Sheldon Precision Lathes, it is more profitable to buy these faster, cost-cutting lathes for the specific job at hand just as you would buy jigs and fixtures.

In savings of tooling costs, operator cost, power cost, and plant loading, as well as extra profits from more pieces per hour, Sheldon Lathes often pay back their cost on a single run.

on a single run.

Sheldon Lathes will work to the closest tolerances—have "Zero Precision" Taper Roller Bearings. They can take a healthy cut when operating at high speed direct drive—have double V-belts to the spindle. They will swing 10", 11" or 13" and have a 1%" hole through the spindle—have sufficient capacity for the great bulk of lathe work. Sheldon Lathes have created a new factor for figuring machinery costs. They are tools you should know about.

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## Welding:

Bicycle rims rolled from strip, welded.

Production of bicycle rims by rolling from coils of flat strip and welding has been speeded at Canada Cycle & Motor Co., Ltd., Weston, Ontario, through use of three seam welders built in the production line.

The seam welders, operating in a 40-ft line, were built by Taylor-Winfield, Warren, Ohio. Flat strip 0.028 in. thick, is fed at rate of 35 fpm.

Formed to shape, the edges fold together and are resistance welded by the three seam welders. The line turns out an average of 5 to 6 rims per minute, depending on size.

The three T-W seam welders (with vertical and special tilted frames) are equipped with antifriction bearing mounted shafts and current collectors.

### Aluminum:

Alloy gets okay for use in pressure vessels.

Manufacturers and users of unfired pressure vessels are offered a valuable new construction material with the recent approval of aluminum alloy GR40A by the Boiler Code Committee of The American Society of Mechanical Engineers.

Alloy GR40A (designation of American Society for Testing Materials) is commercially designated by Aluminum Company of America as A54S.

While A54S is more expensive than 3S and 4S alloys on an equal weight basis, it is more economical on a basis of equivalent strength.

Weight saved in vessels fabricated from this alloy will normally more than offset the increased cost per pound. The lighter weight in itself is often a valuable advantage. These economies are expected to result in use of aluminum for many vessels formerly made of other materials.

Turn Page

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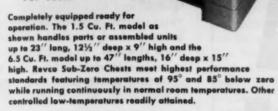
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## Alloy shows improved strength at higher temperatures . . .

Approval of this alloy became effective with the publishing of ASME Case 1174. This case permits the construction of unfired pressure vessels of A54S alloy in accordance with the rules of Section VIII of the 1952 ASME Boiler and Pressure Vessel Code.

Alcoa alloy A54S offers higher mechanical properties than any of the alloys previously approved for welded pressure vessels, 3S, 52S, 4S, etc. For this reason, allowable design stresses are higher.

#### Improved Properties

For elevated temperature operation, A54S alloy becomes even more desirable because it maintains its strength better at higher temperatures. Although A54S alloy can be welded by all conventional methods, the semi-automatic inert-gas metal-arc process and the inert-gas metal-arc process (tungstenarc) are preferred.

#### Preferred Welding Methods

Laboratory tests and vessels in actual use have shown that the tensile strength of butt (groove) welds in A54S material, using A54S filler wire, will exceed the minimum tensile strength of A54S-O by a comfortable margin.

While A54S is more expensive than 3S and 4S alloys on an equal weight basis, it is definitely more economical on the basis of equivalent strength. The weight saved in vessels fabricated from this alloy will normally more than offset the increased cost per pound.

#### **Expect New Uses**

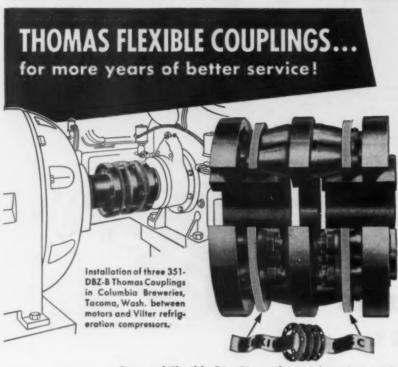
Lighter weight in itself is often a valuable advantage. These economies are expected to result in the use of aluminum for many vessels formerly made of other materials, thereby opening up entire new fields for aluminum.

### **New Books:**

## Progress in materials development reviewed.

Fast changes in use and development complicate the task of keeping pace with modern materials. Aluminum, for example, has shown rapid progress in use and development during recent years. One aid in keeping pace with these changes is through use of data such as that recently brought up to date by AIME.

"Modern Uses of Nonferrous Metals," edited by C. H. Mathewson. Sharp changes in use and improvements in materials have required extensive rewriting of this widely known text on nonferrous metals. Presents a graphic picture of how these materials are used in modern engineering practice. Written in nontechnical language. American Institute of Mining and Metallurgical Engineers, 29 West 39th St., New York 18. \$4.90 to



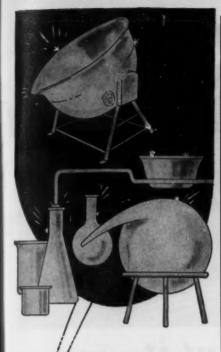
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#### Technical Briefs-

AIME members. \$7.00 to nonmembers. 530 p.

"Freedom's Faith," by C. B. Randall. Faith in the American freeenterprise system, and ability to express that faith forcefully in words as well as actions, have brought Mr. Randall national stature. Discusses the nation's physical wealth, government subsidies, management restraints, labor vs. management, the roles of education and business. Little, Brown & Co., 34 Beacon St., Boston 6, Mass. \$3.00. 198 pp.

"Materials and Processes," Second Edition, by J. F. Young. Written by an engineer for engineers. The book combines a tremendous amount of interrelated information needed to apply engineering fundamentals of materials and processes to the design, production, and control of products John Wiley & Sons, Inc., 440 Fourth Ave., New York 16., \$8.50. 1074 p.

"Handbook Of Standard Time for Machine Shops," by A. A. Hadden and V. K. Genger. Contains detailed standard time data developed by the authors in 25 years' professional practice. Tables can be used in bid and quotation work, calculating subcontract work time, production planning, improving shop efficiency. The Ronad Press Co., 15 East 26th St., New York 10. \$10.00. 473 p.

"Der Industrielle Warmeubergang," by A. Schack. This fourth edition of a well-known book on industrial heat transfer is reviewed by W. Trinks, Professer Emeritus, Carnegie Institute of Technology. Starts with heat flow into and through plates and tubes, for steady and transient conditions. The graphical method of finding transient temperature distribution is given for plates only.

Several theories on heat transfer by convection are compared. The section on the relation between pressure drop and heat transfer is good. Recommended for those who have to design recuperators and regenerators. Verlag "Stahleisen," Dusseldorf, Germany. \$13.93 400





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## Claymont Steel Products

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221

Me

THE IRON AGE

4 But steelmakers still bet on business upturn

4 Scrap price composite falls another 33 cents

Don't sell steel business short; an apturn in production is still in the cards.

Decline of 5 points in the operating rate within the past 3 weeks is not due to a sudden slump in business. The steel outlook today is actually no worse than it was 3 weeks ago. In some respects it is better.

A careful check of producers and consumers in major industrial centers across the nation yields these conclusions on the market outlook:

- An upturn in steel business is still expected.
- Drop in ingot rate was not caused by a fresh decline in steel business; rather it is attributed to postponement of expected pickup.
- Mills grossly underestimated consumer inventories of steel; some inventory corrections may continue for months.
- Mills themselves have heavy inventories of ingots and semi-finished steel.
- Lead times are being drastically shortened, and mills are using their semi-finished stocks to make good on promises of quickest delivery.
- Customers are demanding and getting quality, service, freight absorption, and quick delivery.
- Rate of new orders is increasing, but individual order size is small and tonnage gain is slight.

Drop in the ingot rate is largely due to postponement of the upturn in orders steelmakers had expected. There's no denying producers had counted heavily on an upturn in March, and they are disappointed that it has failed to materialize. But their conviction that business will improve remains unshaken.

In the past several weeks furnaces were kept going longer than justified by current business. Reasons were (1) building stocks for quicker customer service, (2) hope of an early upturn in business, and (3) inertia.

This soon resulted in a heavy buildup of mill inventories. A reliable source estimated that

mill inventories of ingots and semi-finished steel were more than 2 million tons above "normal" at the first of the year. They have risen sharply since then.

When it became clear that the upturn in business would come later than had been expected, some mills had to make fairly sharp cutbacks in production. So what might have been a very mild decline of production several weeks ago was held back and finally registered as a dip.

A special report on the steel market outlook starts on page 75—Ed.

Although steel people have seldom been noted for their optimism, a good many of them might qualify today. Many of them are still betting on a 75 to 80 pct ingot rate for the year. If they are right, 1954 production will be between 90 and 100 million net tons.

Scrap prices fell again this week. THE IRON AGE Steel Scrap Composite Price is off another 33¢ a ton to \$23.50 per gross ton.

Steelmaking operations this week are scheduled at 69.0 pct of rated capacity.

#### Steel Output, Operating Rates

	This Weekt	Last Week	Month Ago	Year
Net Tons Produced (000 omitted)	1,642	1,686	1,774	2,284
Ingot Production Index (1947—49=100)	102.2	105.0	110.4	142.2
District Operating Rate	s			
Chicago	78.0	78.5*	83.5	104.5
Pittsburgh	80.0	83.0	90.0	107.0
Philadelphia	67.0	67.0	76.0	96.0
Valley	61.0	65.0	70.0	102.0
West	72.5	70.0*	79.0	103.0
Detroit	76.0	53.0*	70.0	107.0
Buffalo	63.5	63.5	84.0	94.0
Cleveland	61.0	64.0	75.5	93.0
Birmingham	78.5	0.08	76.5	98.0
S. Ohio River	73.0	75.0	73.5	92.5
Wheeling	85.0	85.0*	0.18	101.0
St. Louis	43.5	45.5	35.5	87.0
East	31.0	53.0	31.0	92.0
Aggregate	69.0	70.5	74.0	100.5

Per cent of capacity for weeks in 1954 is lassed on annual capacity of 124,330,410 net tons as of Jan. 1, 1954. Per cent of capacity for last year is based on annual capacity of 117,547,470 tons as of Jan. 1, 1953.

Tentative

AGE

March 11, 1954

# SOLAR'S

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### Markets at a Glance

Shut Down Furnace... Blast furnace No. 6 at the Youngstown works of U. S. Steel Corp. was shut down recently due to curtailment of steel production. Most of the loss was caused by reduction of bessemer operations from 13 to 6 turns per week.

Record February Building... An optimistic forecast for 1954 construction is upheld by February's all-time high of \$3.3 billion as reported by the U.S. Bureau of Labor Statistics. Total for the first 2 months of the year is running 2 pct ahead of 1953 or \$4.7 billion. A downswing of 25 pct in military construction so far this year has been more than offset by a 50 pct jump in commercial type building activity.

Brazil Gets Biggest Furnace . . . A new 1200-ton-per-day blast furnace was recently blown in at Volta Redonda, Brazil's No. 1 steel plant. The new furnace, 20 pct larger than the mill's first, is expected to help boost Volta Redonda's yearly steel production to about 710,000 tons.

Consumer Prices Up... The National Industrial Conference Board's monthly survey of consumer prices in 10 major cities shows a 1.7-point rise from December 1953 to January 1954. The Board's January '54 index stood at 182.9, while December '53 was 181.2. Index is based on January 1939 prices. As of January 1954 the purchasing value of the dollar was 54.7¢ as compared with 100¢ in January 1939.

Another Openhearth In... Bethlehem Pacific put another openhearth in operation at San Francisco last week. Company also began manufacturing mine roof bolts for the first time at its Seattle shop.

Atomic Power Package . . . Atomic Energy Commission is looking for companies to build a prototype 1250-kw nuclear power plant weighing 10 tons or less. Plant must be suitable for air-transport and able to run continuously for a year on a single charge of uranium fuel. Invitations to bid on a fixed price contract will follow the survey.

Ship 28 Million TV Sets . . . Radio-Electronics-Television Manufacturers Assn. recently reported that 28,468,818 television receivers had been shipped to dealers in the U. S. from 1946 through December 1953.

No Seconds... Secondary quality steel products are beginning to disappear from the market. Main reason is that customers are quality conscious in an easing market. Most producers are turning secondary material back into the furnaces as scrap, depressing that market. But warehouses are thankful as they are having trouble moving prime steel.

Cut Tungsten Stockpiling . . . U. S. purchases of Korean tungsten will cease next month with the expiration of the present contract. Since the war's outbreak the U. S. has been buying all the tungsten ore dug in South Korea for defense needs and stockpiling. Now the stockpiling goal is in sight. However, since tungsten is Korea's only major export, U. S. will help Korea sell it.

Tinplate Prices . . . U. S. Steel Corp. prices of tinplate, blackplate and terneplate will continue unchanged for the pricing period Apr. 1 through Sept. 30.

Plans Oxygen Unit . . . Dominion Foundries & Steel Ltd., Hamilton, Ont., has started its \$10 million expansion program to be carried out this year. Biggest item is a new 100-ton per day oxygen steel furnace.

Repair Ensley Furnaces . . . After running at capacity since the beginning of World War II, the openhearth shop of the Ensley, Ala., Works of Tennessee Coal & Iron Div., U. S. Steel Corp., will shut down operations Apr. 10 for a 4-week repair period.

#### Prices At A Glance

(cents per 1b unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	4.634	4.634	4.634	4.376
Pig Iron (gross ton)	\$56.59	\$56.59	\$56.59	\$55.26
Scrap, No. 1 hvy.				
(gross ton)	\$23.50	\$23.83	\$26.67	\$44.08
Nonferrous				
Aluminum, ingot	21.50	21.50	21.50	20.50
Copper, electrolytic	29.875	29.75	29.75	30.75
Lead, St. Louis	12.30	12.30	12.80	13.30
Magnesium, ingot	27.75	27.75	27.75	27.00
Nickel, electrolytic	63.08	63.08	63.08	63.08
Tin, Straits, N. Y.	90.25	86.75	85.00	\$1.211/2
Zinc, E. St. Louis	9.25	9.25	9.50	11.00

AGE

## U. S. Won't Sign Geneva Tin Pact

International agreement can still go through without U. S. signature . . . RFC will not dump 40,000-ton tin surplus . . . Carry on talks with Indonesia—By R. L. Hatschek.

U. S. decision to refrain from signing the international tin agreement written at Geneva last year is not intended to prevent the compact from becoming effective, State Dept. says. Fact is that a U. S. "aye" is not needed for the proposed plan to go into effect.

Tin producing and consuming countries are each allotted 1000 votes and acceptance of the plan requires 900 votes from producing countries, 333 votes from consumers. The consuming U. S. has a healthy 480 votes — but simple arithmetic shows that these need not be affirmative to carry the proposal. On the other hand an "aye" must be heard from Malaya, Bolivia and Indonesia. All signatures must be affixed by June 30.

Steady Prices . . . Purpose of the agreement, drawn up by both producers and consumers, is to guarantee a minimum price for tin and prevent any repetition of the skyrocket zoom prices took in early 1951 when they rose to a top of \$1.84 per lb.

Briefly, the agreement would set up a 25,000-ton buffer stock with a council set up in London to administer it. Aim would be to keep the floor at 80¢, the ceiling at \$1.10. To do this, the agency would sell when the market price climbed over \$1.00 and buy when it dropped to 90¢. Between 90¢ and \$1.00 the quantity in the buffer pool would remain static.

No Dumping . . . Late last week, when the government stated it would not be a signer, it added that it would hold off the market any excess tin stocks it now has and expects to buy. Present government surplus over what is deemed necessary for the strategic stockpile totals about 40,000 tons—approximately an 8-month national supply.

The assurance that the U. S. won't dump the surplus is viewed in Washington as supporting a government position of neutrality—it doesn't object to the agreement if other governments decide it is in their interest.

Tin buyers, on the other hand, are not in favor as prices will probably be quick to rise still further. Quotation is now several cents over recent prices on the strength of probable ratification of the pact. Price this week had risen to 90.25¢ at New York.

Talk With Indonesians . . . No decision was reached last week in the negotiations between Recon-

struction Finance Corp. and Indonesian representatives. If the 18,000 to 20,000 tons of tin under discussion is purchased from Indonesia, it won't go into the already overflowing stockpile, though.

Most likely it would be resold to consumers, if purchased. You can bet that the purchase price won't be fixed—it'll be tied to the going market quotation.

Study Copper Market . . . Both Anaconda Copper Mining Co. and Kennecott Copper Corp. have requested permission to trim production of their Chilean properties. The Chilean government, quite naturally, doesn't like the idea. So it will conduct a study of world market conditions to determine whether or not it is necessary.

If this survey's findings are unfavorable to continued high-level production, Chile might offer to buy the mines, says the Minister of Mines. Immediate reaction in U. S. copper circles was to question what Chile would use for money.

Scrap Prices Up . . . On the strength of continued export demand, copper and brass scrap prices edged up ½¢ to 1¢ per lb this week at all levels. Dealers are now paying 23¢ to 23½¢ for No. 1 copper, 21¢ to 21½¢ for No. 2 and 19¢ to 19½¢ for light copper. Other dealer buying prices are also up ½¢ per lb. Custom smelters and ingot makers moved up to 24½¢ to 25¢ for No. 1 copper. 23¢ to 23½¢ for No. 2 and 21½¢ to 22¢ for light copper.

Custom smelters last week moved their copper selling price to 29.75¢ per lb narrowing the gap between their prices and the quotations of primary producers to 1/4¢.

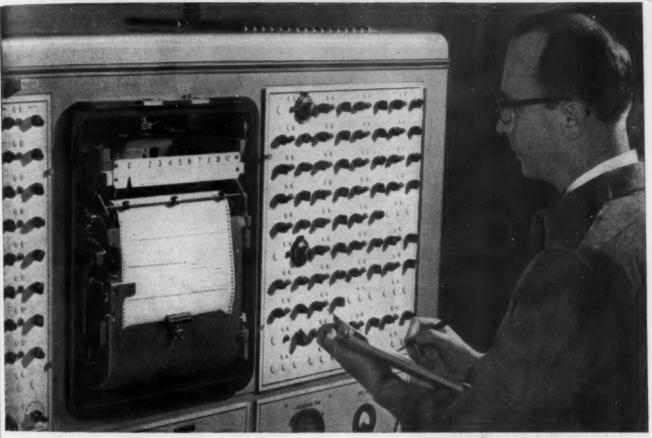
Ingot makers also nudged buying prices for aluminum scrap 1/4 higher this week. At the same time they raised quotations on remelt aluminum ingots 1/4 e to 1/2 e in several grades.

#### NONFERROUS METAL PRICES

(Cents per 1b except as noted)

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	Mar. 3	Mar. 4	Mar. 5	Mar. 6	Mar. 8	Mar. 9
Copper, electro, Conn	29.75-	29.75-	29.75-	29.75-	29.75-	29.75-
	30.00	30.00	30.00	30.00	30.00	30.00
Copper, Lake delivered	30.00	30.00	30.00	30.00	30.00	30.00
Tin, Straits, New York	86.75	87.25	87.25		90.25	90.25*
Zinc, East St. Louis	9.25	9.25	9.25	9.25	9.25	9.25
Lead, St. Louis	12.30	12.30	12.30	12.30	12.30	12.30
Note: Quotations are going p	rices					
*Tentative						

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March 11, 1954

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(Base 30,000 lb, f.o.b. ship. pt. frt. allowed) Flat Sheet: 0.136 in. and thicker, 2S, 3S, 38.9¢; 4S, 36.0¢; 52S, 38.2¢; 24S-O, 24S-OAL, 37.0¢; 75S-OAL, 44.7¢; 0.081-in., 2S, 3S, 36.1¢; 4S, 37.7¢; 52S, 39.9¢; 24S-O, 24S-OAL, 88.4¢; 75S-O, 75S-OAL, 46.9¢; 0.032-in., 2S, 3S, 27.0¢; 34, 41.8¢; 24S-O, 24S-OAL, 46.9¢; 76S-OAL, 58.4¢

Plate, \( \frac{1}{4} \)-in. and Heavier: 2S-F, 3S-F, 82.4\( \); 4S-F, 34.5\( \phi \); 52S-F, 36.2\( \phi \); 61S-O, 35.6\( \phi \); 24S-OAL, 36.9\( \phi \); 75S-O, 76S-OAL, 44.3\( \phi \).

Extraded Solid Shapes: Shape factors 1 to 5, 36.5¢ to 82.8¢; 12 to 14, 37.2¢ to 99.0¢; 24 to 26, 39.9¢ to \$1.29; 36 to 38, 47.2¢ to \$1.89. Red, Relled: 1.064 to 4.5-in., 28-F, 38-F, 43.8¢ to 37.2¢; cold-finished, 0.375 to 3.499-in., 28-F, 38-F, 47.6¢ to 39.3¢.

Serew Machine Stock: Rounds, 11S-T3, ½ to 11/82-in., 59.6¢ to 47.0¢; % to 1½-in., 46.6¢ to 48.8¢; 1 9/16 to 8-in., 42.7¢ to 39.9¢. Base 5000 lb.

Bond b.

Drawn Wire: Coiled 0.051 to 0.374-in., 2S, 44.1¢ to 32.4¢; 52S, 53.4¢ to 39.1¢; 17S-T4, 60.1¢ to 41.8¢; 61S-T4, 58.9¢ to 41.8¢.

Extraded Tubing: Rounds, 63S-T5, OD 1½ to 2-in., 31.6¢ to 60.7¢; 2 to 4 in., 37.7¢ to 51.1¢; 4 to 6 in., 38.2¢ to 46.6¢; 6 to 9 in., 88.7¢ to 48.8¢.

Roofing Sheet: Flat, per sheet, 0.032-in., 42%, x 60 in., \$2.838; x 96 in., \$4.548; x 120 in., \$5.630; x 144 in., \$6.816. Coiled sheet, per lb, 0.019 in. x 28 in.

### Magnesium

Magnesium

(F.o.b. mill, freight allowed)

Sheet and plate: FS1-0½ in., 66¢; 3/16 in., 68¢; ½ in., 70¢; B & B Gage 10, 71¢; 12, 75¢.

Specifications grade higher. Base: 30,000 lb.

Extruded Round Red: M, diam ¼ to 0.311 in. 77¢; ½ to ½ in., 60.5¢; 1¼ to 1.749 in., 86¢; 2½ to 5 in., 51.5¢. Other alloys higher.

Base up to % in. diam, 10,000 lb; % to 2 in., 30,000 lb; 2 in. and larger, 30,000 lb.

Extruded Salid Shapes: Rectangles: M. In.

20,000 lb; 2 in. and larger, 30,000 lb.

Extraded Solid Shapes: Rectangles: M. In
weight per ft, for perimeters less than size indicated; 0.10 to 0.11 lb, 3.5 in., 65.3¢; 0.22 to
0.25 lb, 5.9 in., 62.2¢; 0.50 to 0.59 lb, 8.6 in.,
59.7¢; 1.8 to 2.59 lb, 19.5 in., 65.8¢; 4 to 6
lb, 28 in., 52¢. Other alloys higher. Base, in
weight per ft of shape: Up to ½ lb, 10,000 lb;
½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier,
30,000 lb.

Extraded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD, ½ to 5/16 in., \$1.48; \$/16 to % in., \$1.29; ½ to % in., 96¢; 1 to 2 in., 79¢; 0.165 to 0.219 in. wall; OD, ½ to % in., 64¢; 1 to 2 in., 60¢; 3 to 4 in., 59¢. Other alloys higher. Base, OD: Up to 1½ in., 10,000 lb; 1½ to 8 in., 20,000 lb; over 3 in., 30,000 lb.

# Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades; Sheets and strip, HR or CR, \$15; Plate, HR, \$12; Wire, rolled and/or drawn, \$10; Bar, HR or forged, \$6; Forgings, \$6.

# Nickel, Monel, Inconel

(4	2000		1000, 1.0		
		"A	" Nickel	Monel	Inconel
Sheet, CR			8634	6714	9214
Strip, CR			921/4	70 1/2	981/4
Rod, bar .			82 1/4	65 1/2	88 1/4
Angles, H			82 1/2	65 14	8814
Plate, HR			84 1/4	66 14	9014
Seamless '	Tub	e.	115 1/4	10014	137 14
Shot, block	. 83	6: ×		60	****

# Copper, Brass, Bronze

(Freight included on 500 lb)

			Extruded
	Sheet	Rods	Shapes
Copper	46.41		48.48
Copper, h-r	48.38	44.73	
Copper, drawn.		45.98	
Low brass	44.47	44.41	
Yellow brass .	4.172	41.66	
Red brass	45.44	45.38	
Naval brass	45.76	40.07	41.33
Leaded brass			39.11
Com. bronze	46.95	46.89	
Mang. bronze	49.48	43.62	45.18
Phos. bronze	66.58	67.08	
Muntz metal	43.96	39.77	41.02
Ni silver, 10 pct	55.36		62.63

# PRIMARY METALS

(Cents per lb, unless otherwise noted)
Aluminum ingot, 99+%, 10,000 lb,
freight allowed
Aluminum pig 20.00
Aluminum pig 20.00 Antimony, American, Laredo, Tex. 28.50
Beryllium copper, per lb conta'd Be.\$40.00
Beryllium aluminum 5% Be, Dollars
per lb contained Be\$72.75
Rigmuth ton lote \$2.25
Cadmium, del'd
Cobalt. 97-99% (per lb) \$2.60 to \$2.67
Cadmium, del'd
Copper Lake delivered 30.00
Copper, Lake, delivered 30.00 Gold, U. S. Treas., dollars per oz\$35.00
Indium 99 864 dollars per troy or \$2.25
Indium, 99.8%, dollars per troy oz. \$2.25 Iridium, dollars per troy oz. \$165 to \$175
Lead, St. Louis 12.30
Lead, New York 12.50
Magnesium, 99.8+%, f.o.b. Freeport,
Tex., 10,000 lb, pig 27.00
Tomos 97.75
Ingot
46.00 to 48.00
16.00 to 18.00
Mercury, dollars per 76-lb flask,
f.o.b. New York\$192 to \$195 Nickel electro, f.o.b. N. Y. warehouse 63.08
Nickel electro, 1.o.b. N. Y. warenouse 53.08
Nickel oxide sinter, at Copper
Creek, Ont., contained nickel 56.25
Palladium, dollars per troy oz \$22 to \$24
Platinum, dollars per troy oz \$90 to \$92
Silver, New York, cents per oz 85.25
Tin, New York 90.25
Titanium, sponge \$5.00
Zinc, East St. Louis 9.25
Zinc, New York 9.75
Zirconium copper, 50 pct \$6.20

# REMELTED METALS

# **Brass Ingot**

	enta			7	1	b	d	le	l	11	26	17	ď	d	C	a	7	l	01	æ	da	)
85-5-5	-5 in	go	t																			
No.	115							8										*		*		23.50
No.	120																					22.75
No.	123																					22.25
80-10-	10 in	E	r															•	•	-		
No.		-																				27.75
No.																						25.50
88-10-	2 ins	107	t																			
No.	210											*										36.50
No.	215																					33.00
No.	245		. 4											*				*				28.50
Yellov	v ing																					-
No.	405																					19.75
Mangi	anese																					
No.	421								. *					18			*			*		24.25

# **Aluminum Ingot**

					and over)
95-5 alum					
0.30 cop	per,	max.			.22.00-22.50
0.60 cop	per,	max.			. 21.75-22.25
Piston alle	) 8 (C	No. 12	2 type	)	.19.00-20.00
No. 12 alt	ım. (	No. 2	grade	)	.18.25-19.25
					. 19,00-19.50
					.20.50-21.00
13 alloy					.21.75-22.25
ASX-679					.19.00-19.50

# Steel deoxidizing aluminum, notch-bar granulated or shot

	1-96-9714									
	2-92-95%									
	3-90-92%									
CHRISTIN	4-00-00%	0		0	0	0	0	0		10.00-11.00

# **ELECTROPLATING SUPPLIES**

#### Anodes (Cents per lb. freight alle sened 5000 Th lotal

Constant for 10, // org/nt uniowed, addo s	, ,0,00
Copper Cast, oval, 15 in. or longer Electrodeposited	44.54
Flat rolled	47.14
Cast, oval, 15 in. or longer Zinc, flat cast	43.515
Ball, anodes	18.50
Cadmium	\$4.06
Silver 999 fine. rolled, 100 oz. lots, per troy oz, f.o.b. Bridgeport.	
Conn.	941/6
Chemicals	

One meets	
(Cents per lb, f.o.b. shipping point	(8)
Copper cyanide, 100 lb drum	63.90
Copper sulfate, 99.5 crystals, bbi	12.8
Nickel salts, single or double, 4-100	
lb bags, frt. allowed	20.00
Nickel chloride, \$75 lb drum	38.00
Silver cyanide, 100 oz. lots, per oz. Sodium cyanide, 96 pct domestic	75 1/4
200 lb drums	19.20
Zinc cyanide, 100 lb drum	54.30

# SCRAP METALS

# Brass Mill Scrap

(Cents per shipments	pot	und, a 20,000	dd 1¢ pe D lb and	r lb for
			Heavy	Turning
Copper			26	2514
Yellow brass			19%	18
Red brass			23	221/4
Comm. bronze			23 %	231/4
Mang. bronze			181/4	17%
Yellow brass	rod	ends	191/2	

# Custom Smelters' Scrap

(Cents	per	pound to t								1	01	8,	delivered
No. 1	copper	wire										2	11/2-25
No 2	copper	wire		0		0	0	9				2:	3 -231/2
Light	copper	* ****		*	*	×			*			2	1 14-22
* Refin	ery b	rass .	10			×	*	×	×				21

# Ingot Makers' Scrap (Cents per pound carload lots, delivered to refinery)

to regnery)	
No. 1 copper wire 24	11/2-25
No. 2 copper wire 21	-231
Light copper 21	1 1/2 22
	18
No. 1 comp. turnings 1	7 —174
Rolled brass 1	-151
Brass pipe 10	6 -164
Radiators 1	4 -15
Aluminum	
Mixed old cast 1	1 -12
Mixed new clips 13	21/2-181
Mixed turnings, dry 1	1 1/2-121
Pots and pans 1:	1 -12

# Dealers' Scrap

# (Dealers' buying price, f.o.b. New York in cents per pound)

# Copper and Brass

No. 1 heavy copper and wire.	23 -234
No. 2 heavy copper and wire.	21 -21
Light copper	19 -194
New type shell cuttings	181/2-19
Auto radiators (unsweated)	121/2-13
No. 1 composition	
No. 1 composition turnings	
Unlined red car boxes	14 14
Cocks and faucets	14 14
Mixed heavy yellow brass	191/ 11
Old rolled brass	10 /2-11
Brass pipe	10 72 -10
New soft brass clippings	121/141
Brass rod ends	111/-19
No. 1 brass rod turnings	Y 7 12 74

# Aluminam

Alum. pistons and struts 5	- 6
Aluminum Clauncasos	- 1
28 aluminum clippings 11	-114
Old sheet and utensils 8	- 1
Borings and turnings 5	- 6
Misc. cast aluminum 8	- 1
Dural clips (24S) 9	-10
Tine	

# New zinc clippings 4½ Old zinc 3½ Zinc routings 1½ Old die cast scrap 2½

Nickel and	
Pure nickel clippings .	60 -61
Clean nickel turnings .	60 -61
Nickel anodes	
Nickel rod ends	
New Monel clippings .	
Clean Monel turnings .	
Nickel silver clippings,	mirad.
Nickel silver turnings,	mixed.

	-	•							- 41	11
Soft, scrap, lead							*		9 - 9	
Battery plates									4%-	78.
Batteries, acid i	ree		9			0		*		
	Angr		i	u	m					

# Segregated solids ...... 20 -21 Castings ...... 19 -20 Manallanane

Miscellaneous
Block tin 65 -
No. 1 pewter
No I suto habbitt
Mixed common babbitt
Solder joints
Siphon tops
Small foundry type
Monotype
Lino, and stereotype
Electrotype
Hand picked type shells
Tino and stereo dross

You can't stop a rhino with a popgun





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CORROSION can't be stopped by ordinary paints or conventional protective coatings. They can't protect surfaces against the ravages of rust for any appreciable length of time. But Bitumastic Coatings can. Here are three principal reasons:

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1. Unlike maintenance paints, Bitumastic® Protective Coatings are specially formulated from a coal-tar pitch base\* that is, for all practical purposes, impervious to water. When you keep moisture away from an exposed surface, you stop corrosion.

2. Bitumastic Coatings provide an extra-tough, extra-thick barrier against corrosive elements—a barrier that is impenetrable. These coatings provide up to 8 times the film thickness of conventional paint coatings.

3. Bitumastic Coatings stop corrosion caused by moisture-acid fumes

-alkaline fumes-corrosive soilsalt air-heat.

\*Hi-Heat Gray contains a metallic base.

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Name

City

Zone State



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March 11, 1954

AGE

183

# March Market Upturn Unlikely Now

Hoped-for spurt in orders fails to materialize . . . Scrap men doubt any improvement until April at earliest . . . Composite falls to \$23.50 . . . But trade feels prices can go only up.

March came in more like the Cowardly Lion than any other breed of cat as far as the scrap trade is concerned. Business at mid-month was just about as bad as before, with THE IRON AGE Scrap Composite this week off another 33¢ to \$23.50. Dealers and brokers conceded that the long-awaited order pickup wouldn't come until April, and many didn't expect balmier trade winds until May.

Here and there were some indications that prices had hit bottom. Pittsburgh brokers agree that only small tonnages could be moved at prices prevailing there. In Detroit dealers are starting to buy to lay down once again, despite mill pessimism over order rises. Cleveland's 20-in. snowfall will clog flow of new material for some time, scrap circles there believe. And Cincinnati traders think mills are showing signs they can no longer resist the bargain-basement scrap prices.

Pittsburgh — A consumer-by-consumer check gives the scrap industry nothing to cheer about in this district for balance of the month, at least. Consumer inventories are high, and ingot rates are off. This combination, plus incoming scrap from customer plants, adds up to discouragement from standpoint of sales prospects. Despite the market's weakness there is a feeling that prices may have touched bottom. Brokers were in agreement that only small tonnages can move at prevailing quotations.

Chicago—This market, after a limited amount of activity last week, began slumping again. Purchasing agents report a slide in asking prices and No. 2 bundles continue at a virtual standstill. Allocations in purchase of factory scrap continue. Railroad buying was good at the broker

level, but was not reflected in new mill purchases, and electric furnace continued to slump badly. Consensus of dealer-broker opinion is that there's not much hope for mill buying activity in March, that maybe April will offer some strength. Cast continues in a mild boom.

Philadelphia—Steelmaking scrap prices remain unchanged this week but reported broker buying prices tend to indicate further weakness in the market. Blast furnace prices are down on a new sale of machine shop turnings, but other quotations are at last week's levels.

New York—"What market?" is the stock response from dealers and brokers here when asked about business. Orders are nonexistent for steelmaking and blast furnace grades and no one in the trade sees any improvement in the immediate future.

Detroit—A small purchase of bundles locally and some buying from the Valley dropped No. 1 bundles \$1. However, the trade here feels the bottom has been reached and is backing up this contention by buying to lay down. This seems to contradict mill sentiment which is still pessimistic, but it is doubtful the trade will permit prices to get much lower.

Cleveland—Reports of further steelmaking cutbacks in the Valley have not brightened this market. Although prices remained nominally unchanged there was no assurance bottom had been reached. Near record 20-in. snowfall has left hard-pressed dealers feeling a little more bullish. However, for the rest of this month only production scrap and a trickle of dealer material is expected to move.

Birmingham—After a couple of weeks of activity, the scrap market in this area has again become almost stagnant. Both of the largest buyers in the district are out of the market. St. Louis—With milder weather a small amount of scrap is being moved by truckers, but dealers' receipts consist mostly of material supplied by industries under contract.

Cincinnati—Some dealers and brokers here believe they see signs of strength. Prices have sunk so low mills are now showing a cautious interest in extra tonnages and aren't complaining about overshipments. Dealers who received March buying prices with approval are now showing reluctance to ship at current quotations. Brokers convinced that the market is now on rock bottom expect to see a slight price comeback next month. Random length rails were off \$1 to \$34-\$35 on the basis of a sale,

Buffalo—Strong buying from Canadian sources bolstered the cast market with prices advancing \$1 per ton. Dealers report a sustained demand throughout western New York for cast which is now in short supply. Otherwise the market remains weak with openhearth and blast furnace grades off another \$1. Bidding for industrial supplies is light as dealers with bulging yard stocks are reluctant to accept additional supplies.

Boston—Slight note of stronger feeling was injected by inquiries for No. 2 material, though none has yet been purchased. A trickle of activity in cast grades is the only sign of life remaining in New England scrap business.

West Coast—Another load of 9000 tons of scrap sailed from Oakland for Japan last week, fourth to go from the Northern California area. Cargo was 4000 tons of rails and 5000 tons of No. 1 and 2 heavy melting. Exports are expected to pick up again shortly after April 1 when new Japanese government allocations for scrap imports are made. Some small tonnage distress offerings being made to West Coast consumers at under market price but no sales reported. Only one major mill still in the market this month.

Hamilton — Canadian scrap prices have dropped about \$8 per ton since the beginning of the year but demand has not improved. Steel mills continue out of the market, with only one taking even token deliveries.

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# WHY IT PAYS TO BUY STEEL FROM WAREHOUSE



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- FASTER PRODUCTION
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Warehouses and Sales Offices Coast to Coast

STATES

# Scrap Prices

(Effective Mar. 9, 1954)

# Pittsburgh

No. 1 hvy. melting	24.00 to 21.00 to 24.00 to 19.00 to	25.00 22.00 25.00 20.00
Machine shop turn Mixed bor, and ms. turns. Shoveling turnings Cast iron borings	10.00 to 10.00 to 14.00 to 14.00 to	11.00 11.00 15.00 15.00
Low phos. punch'gs, plate Heavy turnings	27.00 to 21.00 to	28.00
No. 1 RR. hvy. melting Scrap rails, random lgth. Rails 2 ft and under RR. steel wheels	26.00 to 37.00 to 43.00 to 33.00 to	27.00 38.00 44.00 <b>34.00</b>
RR. spring steel RR. couplers and knuckles	33.00 to 33.00 to	34.00
No. 1 machinery cast Cupola cast	41.00 to 34.00 to 29.00 to 27.00 to	42.00 35.00 30.00 28.00

# Chicago

No. 1 hvy. melting	19.00 to 25.00 to 21.00 to 17.00 to 9.00 to 9.00 to 11.00 to	21.00 26.00 23.00 18.00 10.00 12.00 12.00
Low phos. forge crops Low phos. punch'gs, plate Low phos. 3 ft and under No. 1 RR. hvy. melting Scrap rails, random lgth. Rerolling rails Rails 2 ft and under Locomotive tires, cut Cut bolsters & side frames Angles and splice bars	30.00 to 28.00 to 27.00 to 28.00 to 29.00 to 35.00 to 31.00 to 31.00 to 33.00 to 33.00 to	31.00 29.00 28.00 29.00 31.00 36.00 39.00 32.00 33.00 34.00 <b>37.00</b>
RR. steel car axles. RR. couplers and knuckles No. 1 machinery cast. Cupola cast. Heavy breakable cast. Cast iron brake shoes. Cast iron car wheels Malleable Stove plate	31.00 to 35.00 to 32.00 to 26.00 to 33.00 to 31.00 to 38.00 to 26.00 to	33.00 38.00 34.00 28.00 <b>25.00</b> 33.00 39.00 28.00

# Philadelphia Area

No. 1 hvy. melting	22.00 to 19.00 to 22.00 to 17.00 to	\$23.00 20.00 23.00 18.00
Machine shop turn Mixed bor. short turn Cast iron borings Shoveling turnings Clean cast chem borings.	10.00 to 10.00 to 10.00 to 15.00 to 24.00 to	11.00 11.00 11.00 16.00 25.00
Low phos. 5 ft and under Low phos. 2 ft and under Low phos. punch'gs Elec. furnace bundles Heavy turnings RR. steel wheels	25.00 to 26.00 to 26.00 to 24.00 to 20.00 to	27.00 28.00 28.00 25.00 21.00 30.00
RR. spring steel	29.00 to 39.00 to 34.00 to	30.00 40.00 35.00
Heavy breakable cast. Cast iron carwheels Malleable Unstripped motor blocks No. 1 machinery cast. Charging box cast.	35.00 to 38.00 to 38.00 to 27.00 to 38.00 to 35.00 to	37.00 39.00 39.00 28.00 40.00 36.00

# Cleveland

No. 1 hvy, melting \$ No. 2 hvy, melting No. 1 bundles No. 2 bundles No. 1 busheling	20.00 18.00 20.00 15.00 20.00	to to	19.00 21.00 16.00
Machine shop turn Mixed bor. and turn Shoveling turnings Cast iron borings	9.00 13.00 13.00 13.00	to	14.00
Cut struct'r'l plate, 2 ft & under Drop forge flashings	30.00	to	21.00
No. 1 RR. heavy melting Rails 2 ft and under Rails 18 in. and under Railroad grate bars Steel axle turnings Railroad cast.	26.00 43.00 44.00 27.00 19.00 39.00	to to to	44.00 45.00 28.00 20.00
No. 1 machinery cast Stove plate	40.00 33.00 39.00	to	34.00

# Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton deliverd to consumer unless otherwise noted.

# Youngstown

No. 1 hvy. melting .	 \$23.00 to \$24.00	)
No. 2 hvy. melting .	 20.00 to 21.00	)
No. 1 bundles	 23.00 to 24.00	)
No. 2 bundles	 18.00 to 19.00	).
Machine shop turn.	 9.00 to 10.00	
Shoveling turnings .	 13.00 to 14.00	)
Cast iron borings	 13.00 to 14.00	)
Low phos. plate	 26.00 to 27.00	0

### Buffalo

bundio		
No. 1 hvy. melting \$ No. 2 hvy. melting No. 1 busheling No. 1 bundles No. 2 bundles	22.00 to 18.50 to 22.00 to 22.00 to 16.50 to	\$23,00 19,50 23,00 23,00 17,50
Machine shop turn Mixed bor, and turn Shoveling turnings Cast iron borings	11.50 to 13.50 to 15.50 to 13.50 to	12.50 14.50 16.50 14.50
Low phos. plate Scrap rails, random, lgth Rails 2 ft and under RR. steel wheels RR. spring steel RR. couplers and knuckles	27.00 to 32.00 to 39.00 to 34.00 to 34.00 to	28.00 33.00 40.00 35.00 <b>35.00</b> 35.00
No. 1 machinery cast No. 1 cupola cast	35.00 to 31.00 to	36.00 32.00

# Detroit

Brokers' buying prices per gr	ross ton, o	m cars:
No. 1 hvy. melting	\$15.00 to	\$16.00
No. 2 hvy. melting	14.00 to	15.00
No. 1 bundles, openhearth	16.00 to	
No. 2 bundles	14.00 to	15.00
New busheling	15.00 to	16.00
Drop forge flashings	15.00 to	16.00
Machine shop turn. Mixed bor. and turn. Shoveling turnings Cast iron borings	4.50 to 6.50 to 6.50 to 6.50 to	5.50 7.50 7.50 7.50
Low phos. punch's, plate	16.00 to	17.00
No. 1 cupola cast	****	35.00 24.00 28.00 35.00

# St. Louis

No. 1 hvy. melting	24.00 to 22.00 to 24.00 to 19.00 to	23.00 25.00
Machine shop turn Cast iron borings Shoveling turnings	8.00 to 9.50 to 9.50 to	10.50
No. 1 RR. hvy. melting Rails, random lengths Rails, 18 in. and under Locomotive tires, uncut Angles and splice bars Std. steel car axles RR. spring steel	29.00 to 30.00 to 37.00 to 29.00 to 31.00 to 35.00 to 31.00 to	32.00 39.00 30.00 32.00 36.00
Cupola cast.  Hvy. breakable cast. Cast fron brake shoes Stove plate Cast Iron car wheels Malleable Unstripped motor blocks.	36.00 to 23.00 to 30.00 to 29.00 to 30.00 to 34.00 to 23.00 to	24.00 31.00 30.00 31.00 35.00

# New York

Brokers' buying prices per gr	ross to	n, on	cars:
No. 1 hvy. melting			
No. 2 hvy. melting	11.00		
No. 2 bundles		to 10	
Machine shop turn	4.00		00.
Mixed bor. and turn		to ?	
Shoveling turnings Clean cast chem. borings.		to !	0.00
No. 1 machinery cast Mixed yard cast	35.00 29.00		0.00
Charging box cast			0.00
Heavy breakable cast			
Unstripped motor blocks.			00.5

# Birmingham

No. 1 hvy. melting		\$20.00
No. 2 hvy. melting		18.00
		20.00
17. 0 1 31		17.00
		20.00
		2000
	* * * *	13.00
		15.00
		15.00
Electric furnace bundles . \$1	28.00 to	28.50
Bar crops and plate		30.00
Structural and plate, 2 ft.		30.00
	26.00 to	
		40.00
		37.00
		34.00
No. 1 cupola cast	40.00 to	41.00
Stove plate	37.00 to	
	33.00 to	
	23.00 to	
	24.00 to	
Unstripped motor blocks.		
	14.00 to	
Pacton	1 1.00 CC	10.00

#### Boston

Brokers' buying prices per gr	oss ton,	on car
No. 1 hvy. melting	13.00 to	\$14.00
No. 2 hvy. melting	9.00 to	11.00
No. 1 bundles		
No. 2 bundles		
No. 1 busheling	10.00 to	0 11.00
Elec. furnace, 3 ft & under	13.00 to	0 14.00
Machine shop turn		1.00
Mixed bor. and short turn.		
Shoveling turnings	6.00 t	
Clean cast chem. borings.	13.00 t	0 14.00
No. 1 machinery cast	27.00 t	0 28.00
Mixed cupola cast	23.00 t	0 24.0
Heavy breakable cast	25.50 t	0 26.00
Stove plate		
Unstripped motor blocks .	7.00 t	0 8.0
Cincinna	1.2	

#### Cincinnati

will cilling			
Brokers buying prices per gr	mes to	n, i	on care
No. 1 hvy. melting	22.00	to	\$23.00
No. 2 hvy. melting	18.00	to	19.00
No. 1 bundles	22.00	to	23.00
No. 2 bundles	16.00	to	17.00
Machine shop turn	7.00	to	8.00
Mixed bor. and turn	10.00	to	11.00
Shoveling turnings			11.00
Cast iron borings	10.00	to	11.00
Low phos., 18 in. & under	29.00	to	20.00
Rails, random lengths	34.00	to	35.00
Rails, 18 in. and under	42.00	to	43.00
No. 1 cupola cast			35.00
Hvy. breakable cast	29.00	to	30.00
Drop broken cast	40.00	to	41.00
San Francis			
	-		

	\$20.00
No. 2 hvy. melting	16.00
No. 1 bundles	19.00
No. 2 bundles	16.00
No. 3 bundles	12.00
Machine shop turn	5.00
Cast iron borings	9.00
No. 1 RR. hvy. melting	23.00
No. 1 cupola cast\$39.00 to	40.00
Los Angeles	

# 

Cast iron borings	7.00 to	9.00
Elec. fur. 1 ft and under.		25,00
No. 1 RR. hvy. melting . No. 1 cupola cast	37.00 to	20.00 38.00
No. 1 hvy. melting		\$25.00

# No. 2 hvy, melting No. 1 bundles No. 2 bundles No. 3 bundles No. 1 cupola cast. Mixed yard cast. Hamilton, Ont.

No. 1 hvy. mercing	0001	21.00
No. 2 hvy. melting	****	23.00
No 1 bundles		19.00
No. 2 bundles		18.00
Mixed steel scrap	****	19.00
Bushelings	***	12.00
Bush., new fact prep'd	****	18.00
Bush., new fact unprep'd.		13.00
Short steel turnings	****	13.00
Mixed bor. and turn	****	33.00
Rails, remeiting	****	40.00
Cast scrap	***	*****



LEBANON, PENNA. DETROIT (ECORSE), READING, PENNA. MICHIGAN MODENA, PENNA. PITTSBURGH, PENNA.

ERIE, PENNA.

SEATTLE, WASH.

BUFFALO, N. Y. LEBANON, PENNA. READING, PENNA. CHICAGO, ILLINOIS LOS ANGELES, CAL. ST. LOUIS, MO. CLEVELAND, OHIO NEW YORK, N. Y. SANFRANCISCO, CAL.

IMPORT & EXPORT DIV. LIVINGSTON & SOUTHARD, INC. 50 Broadway, New York, N. Y. Cable Address: FORENTRACO

March 11, 1954

5.00

25.00

\$25.00 21.00 22.00 16.00 12.00

AGE !

# **Comparison of Prices**

(Effective Mar. 9, 1954)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in Italics.

	Mar. 9 1954	Mar. 2	Feb. 9	Mar. 10
Fiat-Rolled Steel: (per pound)				
Hot-rolled sheets	3.925€	3.925€	3.925€	3.775€
Cold-rolled sheets	4.775	4.775	4.775	4.575
Galvanized sheets (10 ga.)	5.275	5.275	5.275	5.075
Hot-rolled strip	3.925	3.925	3.925	3.725
Cold-rolled strip	5.513	5.513	5.513	5.20
Plate	4.10	4.10	4.10	5.90
Plates wrought iron	9.30	9.30	9.30	9.00
Stainl's C-R strip (No. 302)	41.50	41.50	41.50	86.75*
Fin and Terneplate: (per base bo	ox)			
Tinplate (1.50 lb.) cokes	\$8.95	\$8.95	\$8.95	\$8.95
Tinplate, electro (0.50 lb.)	7.65	7.65	7.65	7.65
Special coated mfg. terns	7.75	7.78	7.75	7.75
Bars and Shapes: (per pound)				
Merchant bars	4.16€	4.16¢	4.16€	3.95€
Cold finished bars	5.20	5.20	8.20	4.925
Alloy bars	4.875	4.875	4.875	4.675
Structural shapes	4.10	4.10	4.10	3,85
Stainless bars (No. 302)	85.50	35.50	35.50	31.50*
Wrought iron bars	10.40	10.40	10.40	10.05
Wire: (per pound)				
Bright wire	5.525€	5.525€	5.525€	5.225€
Rails: (per 100 lb.)				
Heavy rails	\$4.325	\$4,325	\$4.325	\$3.775
Light rails	5.20	5.20	5.20	4.25
Semifinished Steel: (per net ton				
Rerolling billets	\$62.00	\$62.00	\$62.00	\$59.00
Slabs, rerolling	62.00	62.00	62.00	59.60
Forging billets	75.50	75.50	75.50	70.50
Alloy blooms, billets, slabs	82.00	82.00	82.00	76.00
Wire Red and Skelp: (per poun	d)			
Wire rods	4.525¢	4.525€	4.525€	4.8254
Skelp	8.75	3.75	8.75	3.55
Finished Steel Composite: (per p	oound)			
Base price	4.634¢	4.634€	4.634€	4.376¢

Section   Sect	\$62.00 62.00 75.50 82.00	\$62.00 62.00 75.50 82.00	\$59.00 59.80 70.50 76.00	Nonferrous Metals: (cents per pound to Copper, electrolytic, Conn. 29.875; Copper, Lake, Conn. 30.00 Tin, Straits, New York 90.25¢ Zinc, East St. Louis 9.25	29.75‡ 29. 30.00 30. 86.75 85. 9.25 9.
re rods	4.525¢ 8.75	4.525 <i>€</i> 8.75	4.825¢ 3.55	Lead, St. Louis       12.30         Aluminum, virgin ingot       21.50         Nickel, electrolytic       63.08         Magnesium, ingot       27.75	12.80 12. 21.50 21. 63.08 58. 27.75 27.
hed Steel Composite: (per pound) e price 4.63	lé 4.634é	4.634€	4.376¢	Antimony, Laredo, Tex 28.50 † Tentative. ‡ Average. * Revised.	28.50 29.

<sup>\*</sup> Add 4.7 pct.

# Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold colled sheets and strips.

### Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Phila-delphia, Buffalo, Valley and Birmingham.

### Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Phila-delphia and Chicago.

# PIG IRON

Dellars per gross ten, f.e.b., subject to switching charges.

Producing Paint	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem B3	58.00	58.50	59.00	59.50	
Birmingham R3	52.38	52.88			
Birmingham W9	52.38	52.88			
Birmingham S5	52.38	52.88			
Buffalo R3	56.00	56.50	57.00		
Buffalo H1	56.00	56.50	57.00		
Buffalo W6	56.00	56.50	57.00		
Chicago 14	56.00	56.50	56.50	57.00	
Cleveland A5	56.00	56.50	56.50	57.00	61.00
Cleveland R3	56.00	56.50	56.50		
Daingerfield L3.	52.50	52.50	52.50		
Duluth 14	56.00	56.50	56.50	57.00	
Erie 14	56.00	56.50	56.50	57.00	
Everett M6		63.00	63.50		
Fentana K1	62.00	62.50			
Geneva, Utah C7	56,00	56.50			
Granite City G2.	57.90	58.40	58.90		
Hubbard Y/			56.50		
Minnegua C6	58.00	59.00	59.00		
Monessen P6	5€.00				
Neville Isl. P4	56.00	56.50	56.50		
Pittsburgh U1	56.00	00.00		57.00	
Sharpaville S3	56.00	56.50	56.50	57.00	
Steelton B3	58.00	58.50	59.00	59.50	64.0
Swedeland 42	58.00	58.50	59.00	59.50	04.0
Toledo /4		56.50	56.50	57.00	
Troy, N. Y. R3		58.50	59.00	59.50	64.0
Youngstown YI	30.00	30.30	80.50	57.00	04.0
N. Tenawanda T/		56.50	57.00	31.00	

DIFFERENTIALS: Add 50¢ per ten for each 0.25 pct

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct., \$2 per ton for .05 to 0.75 pct nickel, \$1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 and over.

Silvery Iron: Buffalo, HI, \$68.25; Jackson, JI, GI \$67.00. Add \$1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add \$1 per ton for 0.75 pct. or more phosphorus. Add 75¢ for each 0.50 pct. manganese over 1.0 pct. Bessemer ferrosilicon prices are \$1 over comparable silvery iron.

# STAINLESS STEEL

			-		700
Base	price	cents per	Ib.,	1.0.D.	

Mar. 10

1951

\$5.00

58.93 51.38

59.77 54.50

55.00

\$55.24

43.50 40.50

52.50

50 Ko

\$44.08

17.78

\$1.211 11.00 13.36 20.50

27.00

1954

60.43

**62.88** 

60.27

56.00 56.50 56.50

10.00d

\$56.59

E28.50

25.50 26.00

19.50

29.50 42.50

39.00

34.00

\$26.67

17,25

85.00 9.50 12.80 21.50 53.05

27.75

Product	301	302	303	304	316	321	347	410	416	438
Ingets, rerolling	16.25	17.25	18.75	18.25	28.00	22.75	24.50	14.00		14.25
Slabs, billets, rerolling	20.50-	22.75	24.75	23.75	36.25	29.50	32.25	18.25		18,50
Forg. diaca, die blocks, rings	38.50	38.50	41.50	40.50	60.00	45.50	50.75	31.00	31.75	31.75
Billets, forging	29.50	29.75	32.25	31.00	46.50- 46.75	35.25	39.50	24.00	24.50	24.56
Bars, wires, structurals	35.25	35,50	38.25	37.25	55.50	42.00	46.75	28.75	29.25	29.25
Plates	37.25	37.50	39.75	39.75	58.75- 59.00	45.75- 46.00	51.25	36.00	30.50-	30.50
Sheets	46.25	46.50	48.75	48.75	64.50	55.50	60.75	40.75	41.25	43.5
Strip, het-rolled	29.75	32.00	36.75	34.25	. 55.00	42.00	46.50	26.25		27.00
Strip, cold-rolled	38.25	41.50	45.50	43.75	66.50	54.50	59.25	34.25	41.25	34.7

 Pig Iron: (per gross ton)
 1954

 Foundry, del'd Phila.
 \$61.19

 Foundry, Valley
 56.50

 Foundry, Southern, Cin'ti
 60.43

 Foundry, Birmingham
 52.88

 Foundry, Chicago
 56.50

 Basic del'd, Philadelphia
 60.27

 Basic, Valley furnace
 56.00

 Malleable, Chicago
 56.50

 Malleable, Valley
 86.50

 Ferromanganese\*, cents per lb.
 10.00¢

Pig Iron Composite: (per gross ton) Pig iron ..... \$56.59

| Scrap: (per gross ton) | No. 1 steel, Pittsburgh | \$24.50 | No. 1 steel, Phila area | 22.50 | No. 1 steel, Phicago | 23.50 | No. 1 bundles, Detroit | 16.50 | Low phos., Youngstown | 26.50 | No. 1 mach'y cast, Pittsburgh | 41.50 | No. 1 mach'y cast, Philadel'a | 39.00 | No. 1 mach'y cast, Chicago | 34.56

Steel Scrap Composite: (per gross ton)
No. 1 heavy melting scrap .. \$23.50

Coke, Connellaville: (per net ton at oven) Furnace coke, prompt ...... \$14.38 Foundry coke, prompt ...... 17.25

‡ 76 pct Mn base.

1954

1954

\$61.19

60.43

52.88

60.27

56.00 56.50

10.00€

\$56.59

\$24.50

22.50 24.50

17.50

26.50

39.00

34.00

\$23.83

STAINLESS STEEL PRODUCING POINTS (To identify producers, see Key on p. 193)

Sheets: Midland, Pa., CII; Brackenridge, Pa., A3; Butler, Pa., A7; McKeesport, Pa., UI; Washington, Pa., W2, J1;
Baltimore, EI; Middletown, O., A7; Massillon, O., R3; Gary, UI; Bridgeville, Pa., U2; New Castle, Ind., 12; Ft. Wayns, J4; Lockport, N. Y., R4.

Strip: Midland, Pa., C11; Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Leechburg, Pa., A3; Bridgeville, Pa., U2; Detroit, M2; Canton-Massillon, O., R3; Middletown, O., A7; Harrison, N. J., D3; Youngstown, C5; Lockport, N. Y., S4; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Coma., U3 (23) per lb higher) W1 (23) per lb higher). New Bedford, Mass., R6.

Bars: Baltimore, A7; Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; Chicago, U1; Syracuse, N.; Watervliet, N. Y., A3; Waukegan, A5; Lockport, N. Y., S4; Canton, O., T5; Ft. Wayne, I4.

Wire: Waukegan, A5; Massillon, O., R5; McKeesport, Pa., F1; Ft. Wayne, J4; Harrison, N. J., D3; Baltimore, Al. Dunkirk, A3; Monessen, P1; Syracuse, C11; Bridgeville, U2.

Structurals: Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11.

Plates: Brackenridge, Pa., A3; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., 12; Lockport, N. Y., S4; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, R3; Coatesville, Pa., C15.

Forged discs, die blocks, rings: Pittsburgh, C11; Syracuse, C11; Ferndale, Mich., A3; Washington, Pa., J2.

Forging billets: Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., B; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11.

View of 14" -12"--10" Mild Steel Rod Mill

.69 .00 .93 .38 .00 .77 .50

.00 .06¢

4.08

4.76

.h. mili 430 14.25 18,50 31.75 24.50 29.25 30.50 43.50 27.00 34,75

2; Lockport

ton. O., R3;

N AGE

View of 36" Blooming Mill

When it's tonnage that counts

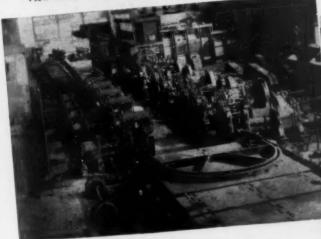
depend on

**BIRDSBORO** 

STEEL MILL MACHINERY

For producing Blooms, Billets, Rod, Strip and Merchant Bar.

> Birdsboro engineering skill makes possible modern equipment like this that you'll find in leading mills mass-producing billets, rod, sheet, strip, plate and other products to meet today's critical demands. Whenever you find it necessary to modernize your present equipment or add to your facilities-it may be this year or the next-Birdsboro engineers will be glad to work with you on your individual problems.



View of 10" Strip Mill



STEEL MILL MACHINERY STEEL FOUNDRY & MACHINE CO.

Designers and Builders of: Steel Mill Machinery . Crushing Machinery . Rolls Hydraulic Presses . Special Machinery . Steel Castings

Offices in: BIRDSBORO, PA. AND PITTSBURGH, PA.

MM-16-R

March 11, 1954

189

	STEEL	BILLE	TS, BLOG	oms,	PIL-		SHAPES				STR	IP		
	(Effective Mar. 9, 1954)	Carbon Rerolling	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide- Flange	Hot- rolled	Cold- rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot- rolled	Alloy Cold roller
1		Net Ton			Steel				Foued	rolled	Alloy	Autoy	Polici	Police
	Bethlehem, Pa.			\$82.00 B3		4.15 B3	6.20 B3	4.15 B3				7.72		-
	Buffalo, N. Y.	\$62.00 B3	\$75.50 B3, R3	\$82.00 B3, R3	4.925 B3	4.15 B3	6.20 B3	4.15 B3	3.925 B3, R3	5.45 B3	5.00 B3	8.425 B3		
-	Claymont, Del.													-
-	Coatesville, Pa.													
-	Conshohocken, Pa.								4.05 A2		5.90 A2			
-	New Bedford, Mass.									6.00 R6				-
SS -	Harrison, N. J.													12.00 (
-	Johnstown, Pa.	\$62.00 B3	\$75.50 B3	\$82.00 B3		4.15 B3	6.20 B3							-
-	Morriaville, Pa.													-
	New Haven, Conn.									5.90 DI 6.20 A5		-		
100	Phoenixville, Pa.					4.15 P2		4.95 P2						-
-	Sparrows Pt., Md.								3.925 B3	5.45 B3	6.00 B3	8.425 B3		
	Wallingford, Conn.									5.90 W/				
	Worcester, Mass.									6.30 A5				12.30
-									110.51					12.45
	Alten, III.	-					-		4.10 L1					-
-	Ashland, Ky.		and to Di	220 00 D3	-	-	-		3.925 A7					12.00
	Canten-Massillon, Dever, Ohio		\$75.50 R3	\$82.00 R3, T5										14.00
	Chicago, Ill.	\$62.00 UI	\$75.50 R3, U1,W8	\$82.00 U1, W8,R3	4.925 UI	4.10 UI, W8	6.175 UI, YI	4.10 UI	3.925 AI. W8	5.70 Al	5.95 R3		6.40 W8	
	Sterling, III.		01,112	77 0,120					70				-	-
-	Cleveland, Ohio		\$75.50 R3			-				5.45 A5,J3		7.80 J3 8.15 A5		12.00
											70			12.15
_	Detroit, Mich.			\$84.00 R5	3				4.125 G3 4.15 M2	5.65 D1,D2, G3,M2,P11		7.90 D2 8.35 G3		
WEST	Duluth, Minn.													
MIDDLE W	Gary, Ind. Harbor, Indiana	\$62.00 UI	\$75.50 UI	\$82.00 UI, YI	4.925 13	4.10 <i>I</i> 3,	6.175 UI, I3		3.925 <i>13,</i> <i>U1,Y1</i>	5.70 /3	5.95 UI. 13 6.45 YI		6.40 UI	
M	Granite City, III.													
	Kokomo, Ind.	-												
	Mansfield, Ohio													
	Middletown, Ohio							Sec. (10.10 Access to 17.00 Acc		5.45 A7				
	Niles, Warren, Ohio								3.925 SI	5.45 S1, T4	5.95 SI	7.65 5/	6.40 SI	12.00
	Sharon, Pa. Pittaburgh, Pa. Midland, Pa.	\$62.00 UI, J3	\$75.50 J3,	\$82.00 UI, CII	4.925 UI	4.10 J3, UI	6.175 J3, UI	4.10 UI	3.925 A7,P6 3.95 S7	5.45 B4, J3, S7		7.80 J3	6.40 S9 6.45 S7	12.00
	Butler, Pa.								4.425 S9	*			-	-
	Pertamenth, Ohio					2 to W/3			3.925 P7	7 45 E2	FAE IV3	8.15 W3	-	-
	Weirton, Wheeling, Follansbee, W. Va.					4.10 W3			3.925 W3	5.45 F3, W3	5.95 W3	8.15 17		
	Youngstewn, Ohie			\$82.00 YI, C10		4.10 YI	6.675 Y/		3.925 R3, U1,Y1	5.45 R3, Y1 5.95 C5	5.95 UI, R3 6.45 YI	7.60 R3 8.30 YI	6.40 UI	12.00
	Fontana, Cal.	\$70.00 K!	\$83.50 K1	\$101.00 K1		4.75 K1	6.825 K1	5.10 KI	4.70 K1	7.35 K1	7.05 K1		7.80 KI	13.65
	Geneva, Utah		\$75.50 C7			4.10 C7	6.175 C7							
	Kansas City, Mo.					4.80 S2	6.875 S2		4.625 S2		6.65 S2		7.10 52	-
-	Los Angeles, Torrance, Cal.		\$85.00 B2	\$102.00 B2	2	4.80 B2, C7	6.85 B2		4.675 B2, C7	7.50 CI			7.60 B2	
WEST	Minnequa, Colo.		-		-	4.55 C6	-	-	5.825 C6	-		-	-	1
2	San Francisco, Niles,	-	\$85.00 B2	-	-	4.75 B2	6.80 B2	-	4.675 B2,		-	-	-	
	Pittsburg, Cal.					4.91 P9			C7					-
	Seattle, Wash.		\$89.00 B2, S11			4.85 B2	6.90 B2							
	Atlanta, Ga.								4.125 /48					
SOUTH	Fairfield, Ala. Alabama City, Ala.	\$62.00 T2	2 \$75.50 T2			4.10 R3, T2	6.175 T2		3.925 R3, T2		5.95 T2			
0	Alabama only												6.80 52	-

Het-rolled 18 ga. & hvyr.				SHEETS					ROD	TINP	LATE†	BLACK PLATE	PRICES
	Cold- rolled	Galvanized	Enameling 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot- rolled 19 ga.		Cokes* 1.25-lb, base box	Electro* 0.25-lb. base box	Holloware Enameling 29 ga.	(Effective Mar. 9, 1954)
				2									Bethlebem, Pa.
1,925 B3	4.775 B3				5.90 B3	7.225 B3			4.525 W6				Buffalo, N. Y.
3.92.5 (5)	4.010 10.0												
										† Special co	t 95¢ from		Claymont, Del.
								-		1.25-lb coke price. Cap-r	naking quality		Coatesville, Pa.
4.05 A2					5.90 A2					blackplate 5 deduct \$2.20	from 1.25-lb		Conshohocken, Pa. Harrisburg, Pa.
										* COKES: add 25é.	1.50-lb		Hartford, Conn.
									4.525 B3	ELECTRO	: 0.50-lb add		Johnstown, Pa.
vent tit	4 075 111								4.323 13	25¢; 0.75-lb \$8.80 U/	\$7.50 UI		Morrisville, Pa.
4.025 U1	4.875 UI									\$6.00 C/	\$1.30 O1		New Haven, Conn.
									-				Phoenixville, Pa.
3.925 B3	4.775 B3	5.275 B3			5.90 B3	7.225 B3	8.075 B3		4.625 B3	\$8.80 B3	\$7.50 B3		Sparrows Pt., Md.
J									4.825 A5				Worcester, Mass.
													Tt N I
									170.71				Trenten, N. J.
2 2 2 2 2		F 975 47							4.70 L1				Alten, Ill.
3.925 A7		5.275 A7 5.275 R1,	5.175 A7					5.05 R/					Ashland, Ky.
3.925 A1,		R3			5.90 UI				4.525 A5,				Dover, Ohio Chicago, Joliet, III.
W8									N4,R3				e. r m
									4.625 N4				Sterling, III.
3.925 J3, R3	4.775 J3, R3		5.175 R3		5.90 J3, R3	7.225 J3, R3			4.525 A5				Cleveland, Ohio
4.125 G3 4.15 M2	4.975 G3		-		6.10 G3	7.425 G3							Detroit, Mich.
3.925 N5									-				Newport, Ky.
3.925 13, UI, YI	4.775 <i>I</i> 3, <i>UI</i> , <i>YI</i>	5.275 U1,13	5.175 <i>13</i> , <i>UI</i>	5.675 UI	5.90 UI, I3 6.40 YI	7.225 UI 7.725 YI				\$8.70 I3, UI, YI	\$7.40 <i>I3</i> ,	6.10 UI, YI	Gary, Ind. Harbor, Indiana
4.125 G2	4.975 G2	5.475 G2	5.87\$ G2								\$7.60 G2	6.30 G2	Granite City, III.
4.025 C9	1.010 02	5.375 C9	3.013 02					5.025 C9			\$1.00 US	0.00 02	Kokomo, Ind.
		0.010 C		5.675 E2				5.05 E2	-		-		Mansfield, Ohio
	4.775 A7		5.175 A7	5.675 A7				0.00		-		-	Middletown, Ohio
3.925 S1	5.80 N3	5.275 N3	6.525 N3	5.45 SI 5.675 N3	5.90 S1		-				\$7.40 R3		Niles, Ohio
3.925 J3, U1,P6, A7	4.775 J3, UI,P6	5.275 U/	5.175 <i>UI</i>	5.675 N3	5.90 J3, UI	7.22 J3, UI	7.925 UI		4.525 A5 4.725 P6	\$8.70 J3.	\$7.40 J3,	6.10 UI	Sharon, Pa.  Pittsburgh, Pa.  Midland, Pa.
A7	01,76				U	UI			4.723 70	07	01		Butler, Pa.
3.925 P7	4.775 P7								4.525 P7				Pertsmouth, Ohio
3.925 W3, W5	4.775 W3, W5,F3	5.27\$ W3, W5		5.675 W3, W5	5.90 W3	7.225 W3				\$8.70 W3, W5	\$7.40 W3, W5	6.10 F3, W5	Weirton, Wheeling, Follansbee, W. Va.
3.925 R3, U1, Y1	4.775 R3, YI		5.175 Y/		5.96 UI,R3 6.40 YI	7.225 R3 7.725 Y1			4.525 Y/	\$8.70 R3			Youngstown, Ohio
4.70 K!	5.875 K1				6.675 K1	8.275 K/			5.325 K1				Fontana, Cal.
4.025 C7													Geneva, Utah
								4.775 C6	4.865 S2				Kansas City, Mo.
4.625 C7		6.275 C7							5.325 B2				Los Angeles, Torrance, Cal.
									4.775 C6				Minnequa, Colo.
4.625 (7	5.725 C7	6.025 C7	7 1						5.175 C7	\$9.45 C7	\$8.15 C7		San Francisco, Niles,
													Pittsburg, Cal. Seattle, Wash.
								-					Atlanta, Ga.
3.925 R i	4.775 T2	5.275 R3,			5.90 T2			5.125 T2	4.525 T2	\$8.80 T2	\$7.50 T2		Fairfield, Ala.
4.425 50		T2 7.			4.94 14			5.225 R3	R3	40.04 12	41.00 12		Alabama City, Ala.

March 11, 1954

Alloy Coldrolled

2.00 CII

2.30 A5 2.45 N7

2.00 G4

12.00 S/

12.00 Ci

13.65 K

AGE

	RON AGE				an acy at cold of	table. Base pr	1				and apply.	-
P	RICES			BAR	ts				PLA	TES		WIRE
. 3	(Effective Mar. 9, 1954)	Carbon Steel	Reinforc- ing	Cold Finished	Alloy Hot- rolled	Alloy Cald Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfgr's. Bright
	Bethlehem, Pa.				4.875 B3	6.325 B3	6.225 B3					
1	Buffalo, N. Y.	4.15 <i>B3</i> 4.18 <i>R3</i>	4.15 B3,R3	5.25 B5	4.875 B3,R3	6.325 B3,B5	6.225 B3	4.10 B3			6.25 B3	5.525 W6
	Clayment, Del.							4.10 C4		5.55 C4		
	Coatesville, Pa.							4.10 L4		5.55 L4		
	Conshehecken, Pa.							4.10 A2	5.15 A2		6.25 A2	
	Harrisburg, Pa.							4.10 C3	5.15 C3			
	Hartford, Conn.			5.75 R3		6.775 R3						
_	Johnstown, Pa.	4.15 B3	4.15 B3		4.875 B3		6.225 B3	4.10 B3		5.55 R1	6.25 B3	5.525 B3
EASI	Merrisville, Pa.	4.30 UI	4.30 U1		5.025 U1							
	Newark, N. J.			5.65 W10		6.65 W10						
	New Haven, Conn.											
	Camden, N. J.			5.65 P10		6.50 P10					-	
-	Putnam, Coon.		4 15 D2	5.75 W10				410 P2		e ee D2	6.25 B3	3.625 B3
	Sparrows Pt., Md.		4.15 B3	E TE DS		# 77F DC		4.10 B3		5.55 B3	6.23 B)	5.825 A5.
	Palmer, Worcester, Mansfield, Mass.			5.75 <i>B5</i> 6.10 <i>W11</i>		6.775 B5						W6
	Readville, Mass.			5.75 C/4								
	Alten, III.	4.35 L1										5.70 LI
	Ashland, Ky.							4.10 A7				
	Canton-Massillon, Ohio			5.20 R2.R3	4.875 R3, T5	6.325 R2,R3, T5						
	Chicago, Joliet, Ill.	4.15 U1, N4,W8 4.22 R3	4.15 R3,N4	5.20 A5,W10, W8,B5,L2	4.875 U1, W8,R3	6.325 A5,W8, W10,L2, R3,B5		4.10 UI,W8	5.15 UI	5.55 U1	6.25 UI	S.52S A1, R3,N4,V
-	Cleveland, Ohio	4.21 R3	4.15 R3	5.20 A5,C13		6.325 A5, C13		4.10 J3,R3	5.15 J3		6.25 J3	5.525 A5, R3,C/3
	Detroit, Mich.	4.30 R5 4.35 G3		5.35 R5,P8 5.40 B5 5.45 P3	4.975 R5 5.075 G3	6.425 R5 6.475 P8 6.525 B5,P3	6.425 G3	4.30 G3			6.45 G3	
_	Duluth, Minn.											5.525 A5
WEST	Gary, Ind. Harbor, Crawfordsville	4.15 <i>I3</i> , <i>U1</i> ,	4.15 <i>I3, U1,</i> <i>Y1</i>	5.20 R3	4.875 13, UI, YI	6.325 R3,M5	6.225 U1,I3 6.725 Y1	4.10 <i>I3, U1,</i> Y1	5.15 /3	5.55 UI	6.25 UI, I3 6.75 YI	5.625 M4
MIDDLE	Granite City, III.							4.30 G2				
MIC	Kokomo, Ind.											5.625 C9
	Sterling, Ill.	4.25 N4	4.25 N4									5.625 N4
	Niles, Ohio Sharon, Pa.							4.10 SI		5.5\$ SI	6.25 SI	
	Pittsburgh, Pa. Midland, Pa. Portsmouth, Ohio	4.15 J3, U1	4.15 J3, U1	5.20 A5, J3, W10, R3, C8	4.875 UI,CII	6.325 A5,C11, W10,C8,	6.225 J3, U1	4.10 J3, UI	5.15 UI	5.55 UI	6.25 J3, UI	5.525 AS J3,P6
	Weirten, Wheeling,	4.15 W3			-			4.10 W3				-
	Follansbee, W. Va. Youngstewn, Ohio	4.15 UI, YI	4.15 R3, U1,	5.20 Y1,F2	4.875 UI, YI		6.225 UI	4.10 R3, UI,			6.75 Y/	5.525 Y/
_		4.20 R3	Y1		C10	C10,F2	6.725 Y/	YI				
	Emeryville, Cal.	4.90 ]5	4.90 JS	-		-					eac VI	
	Fentana, Cal.	4.85 K1	4.85 K1		5.925 K1		7.475 KI	4.75 K/		6.60 K1	6.95 KI	-
	Geneva, Utah	4 95 51	4.05.53	-	E 875 C3		2.000 00	4.10 C7	-		6.25 C7	6.125.52
-	Kansas City, Mo.	4.85 S2 4.85 B2,C7	4.85 S2 4.85 B2,C7	8.65 02	5.575 S2		6.925 S2	-				6.475 B
WEST	Les Angeles, Terrance, Cal.	4.00 DZ,C/	4.65 BZ,U/	6.65 R3	5.925 B2		6.925 B2					
100	Minnequa, Colo.	4.60 C6	4.75 C6					4.95 C6				5.775 C6
	Portland, Ore.	4.90 02										
	San Francisco, Niles Pittsburg, Cal.	4.90 B2	4.85 C7,P9 4.90 B2				6.975 B2					6,475 C7
	Seattle, Wash.	4.90 B2,N6					6.975 B2	5.00 B2			7.15 B2	5.725 A
ТН	Atlanta, Ga. Fairfield, Ala. Alabama City, Ala.	4.35 A8 4.15 T2 4.18 R3	4.35 A8 4.15 R3, T2				6.225 T2	4.10 R3, T2			6.25 T2	5.525 R 77
SOUTH	Houston, Ft. Worth Lone Star, Tex.		4.55 S2		5.375 S2			4.50 L3 4.60 S2				5.925 S

# Steel Prices

(Effective Mar. 9, 1954)

# Key to Steel Producers

With Principal Offices

Al Acme Stee Co., Chicago

Al Alan Wood Steel Co., Conshohocken, Pa.

E

13

45,

A5,

15

M4

10

5 N4

5 P7

15 YI

25 SZ 75 B2 775 CK

725 .48

525 R3,

925 SZ

AGE

- 43
- Alan Wood Steel Co., Conshohoteken, Pa.
  Allegheny Ludkum Steel Corp., Pittsburgh
  American Cladmetals Co., Carnegie, Pa.
  American Steel & Wire Div., Cleveland
  Angell Nail & Chaplet Co., Cleveland
  Armco Steel Corp., Middletown, O.
  Atlantic Steel Co., Atlanta, Ga.
- 46
- 47
- Babcock & Wilcox Tube Div., Beaver Falls, Pa.
- Bethlehem Steel Co., Bethlehem, Pa. 812

- 87 Bethlehem Pacific Coast Steel Corp., San Francisco
  88 Bethlehem Steel Co., Bethlehem, Pa.
  89 Blair Strip Steel Co., New Castle, Pa.
  85 Bliss & Laughlin, Inc., Harvey, Ill.
  61 Calstrip Steel Corp., Los Angeles
  62 Carpenter Steel Co., Reading, Pa.
  63 Central Iron & Steel Co., Harrisburg, Pa.
  64 Claymont Products Dept., Claymont, Del.
  65 Cold Metal Products Co., Youngstown
  66 Colorado Fuel & Iron Corp., Denver
  67 Columbia Geneva Steel Div., San Francisco
  68 Columbia Steel & Shafting Co., Pittsburgh
  69 Continental Steel Corp., Kokomo, Ind.
  610 Copperweld Steel Co., Fittsburgh, Pa.
  611 Crucible Steel Co. of America, New York
  612 Cumberland Steel Co., Cumberland, Md.
  613 Cuyahoga Steel & Wire Co., Cleveland
  614 Compressed Steel Shafting Co., Readville, Mass.
  615 G. O. Carlson, Inc., Thorndale, Pa.
- C15 G. O. Carlson, Inc., Thorndale, Pa.
- D1 Detroit Steel Corp., Detroit
  D2 Detroit Tube & Steel Div., Detroit
- D3 Driver Harris Co., Harrison, N. J.
  D4 Dickson Weatherproof Nail Co., Evanston, Ill.
- El Eastern Stainless Steel Corp., Baltimore
- E2 Empire Steel Co., Mansfield, O.
- FI Firth Sterling, Inc., McKeesport, Pa.
- F2 Fitzainmons Steel Corp., Youngstown
  F3 Follansbee Steel Corp., Föllansbee, W. Va.
- Gl Globe Iron Co., Jackson, O.

- G7 Granite City Steel Co., Granite City, Ill.
- G3 Great Lakes Steel Corp., Detroit
  G4 Greer Steel Co., Dover, O.
- HI Hanna Furnace Corp., Detroit
- 12 Ingersoll Steel Div., Chicago
- 13 Inland Steel Co., Chicago 13 Inland Steel Co., Chicago
  14 Interlake Iron Corp., Cleveland

- JI Jackson Iron & Steel Co., Jackson, O.
  J2 Jessop Steel Corp., Washington, Pa.
  J3 Jones & Laughlin Steel Corp., Pittsburgh
  J4 Joslyn Mfg. & Sasonly Co. Chicago
- J5 Judson Steel Corp., Emeryville, Calif.

  K1 Kaiser Steel Corp. Emeryville, Calif.

- K1 Kaiser Steel Corp., Fontana, Cal.
  K2 Keystone Steel & Wire Co., Peoria
  K3 Koppers Co., Granite City, Ill.
  - LI Laclede Steel Co., St. Louis
- L2 La Salle Steel Co., Chicago
  L3 Lone Star Steel Co., Dallas
- L4 Lukens Steel Co., Coatesville, Pa.
- M1 Mahoning Valley Steel Co., Niles, O

- M2 McLouth Steel Corp., Detroit
  M3 Mercer Tube & Mig. Co., Sharon, Pa.
  M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
  M5 Monarch Steel Co., Inc., Hammond, Ind.
  M6 Mystic Iron Works, Everett, Mass.
  N1 National Supply Co., Pittsburgh
  N2 National Tube Co., Pittsburgh

- N1 National Supply Co., Pittsburgh
  N2 National Tube Co., Pittsburgh
- National Tube Co., Pittsburgh

  N3 Niles Rolling Mill Div., Niles, O.

  N4 Northwestern Steel & W.
- N5 Newport Steel Corp., Newport, Ky.
  N6 Northwest Steel Rolling Mills, Seattle
- No Northwest Steel Rolling Mills, Seattle

  N7 Newman Crosby Steel Co., Pawtucket, R. I.

  W2 Washington Steel Corp., Washington, Pa.

  W3 Weirton Steel Co., Washington, W. Va.
- 01 Oliver Iron & Steel Co., Pittsburgh
- 02 Oregon Steel Mills, Portland
- P6 Pittsburgh Steel Co., Pittsburgh
- P7 Portsmouth Div., Detroit Steel Corp., Detroit

- P8 Plymouth Steel Co., Detroit
- P9 Pacific States Steel Co., Niles, Cal.
  P10 Precision Drawn Steel Co., Camden, N. J.
- P11 Production Steel Strip Corp., Detroit
- R1 Reeves Steel & Mfg. Co., Dover, O. R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
- R3 Republic Steel Corp., Cleveland
- R4 Roebling Sons Co., John A., Trenton, N. J.
- R5 Rotary Electric Steel Co., Detroit
- R6 Rodney Metals, Inc., New Bedford, Mass.
- Si Sharon Steel Corp., Sharon, Pa.
- S2 Sheffield Steel Corp., Kansas City S3 Shenango Furnace Co., Pittsburgh
- S4 Simonds Saw & Steel Co., Fitchburg, Mass.
- S5 Sloss Sheffield Steel & Iron Co., Birmingham
- S6 Standard Forging Corp., ChicagoS7 Stanley Works, New Britain, Conn.
- S8 Superior Drawn Steel Co., Monaca, Pa.
- S9 Superior Steel Corp., Carnegie, Pa.
- S10 Sweet's Steel Co., Williamsport, Pa.
  S11 Seidelhuber Steel Rolling Mills, Seattle
- TI Tonawanda Iron Div., N. Tonawanda, N. Y.
- 72 Tennessee Coal & Iron Div., Fairfield
- 73 Tennessee Products & Chem. Corp., Nashville
- 74 Thomas Strip Div., Warren, O.
  75 Timken Steel & Tube Div., Canton, O.
- 76 Tremont Nail Co., Wareham, Mass,
- 77 Texas Steel Co., Fort Worth
- UI United States Steel Corp., Pittsburgh
- U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
- U3 Fred Ulbrich & Sons, Wallingford, Conn.
- WI Wallingford Steel Co., Wallingford, Conn.

- W4 Wheatland Tube Co., Wheatland, Pa.
  W5 Wheeling Steel Corp., Wheeling, W. Va.
  W6 Wickwire Spencer Steel Div., Buffalo

- P1 Page Steel & Wire Div., Monessen, Pa.
  P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
  P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
  P4 Pittsburgh Coke & Chemical Co., Pittsburgh
  P5 Pittsburgh Screw & Bolt Co., Pittsburgh
  P6 Pittsburgh Screw & Bolt Co., Pittsburgh
  P7 Pittsburgh Screw & Bolt Co., Pittsburgh
  P8 Pittsburgh Screw & Bolt Co., Pittsburgh
  P9 Pittsburgh Screw & Bolt Co., Pittsburgh
  P1 Worcester Pressed Steel Co., Worcester, Mass.
  - Y/ Youngstown Sheet & Tube Co., Youngstown

# PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about \$200 per net ton.

							BUTTY	WELD										SEAN	ILESS			
	1/2	In.	3/4	ln.	11	n.	11/4	In.	11/2	În.	2 1	n.	21/2-3	In.	2	In.	21/2	In.	3 1	n.	31/2-	4 In.
STANDARD T. & C. Sparrows Pt. B3 Toungstown R3 Fontan KI Fontan KI Fittsburgh J3 Alton, III. L1 Sharon M3 Moerisville N2 Pittsburgh N1 Wheeling W5 Whealland W4 Youngstown YI Indiana Harbor Y1 Lorain N2 EXTRA STRONG	24.25 26.25 24.25 26.25 26.25	10.0 +2.0 10.0 8.0 10.0 10.0 10.0 10.0 9.0	Bik. 27.25 29.25 16.25 29.25 27.25 29.25 29.25 29.25 29.25 29.25 29.25 29.25 29.25	1.0 14.0 12.0 14.0 14.0 14.0 14.0 14.0 13.0	Bik. 29.75 31.75 18.75 31.75 29.75 31.75 29.75 31.75 31.75 31.75 31.75	15.5 17.5 17.5 17.5 17.5 17.5 16.5	Bik.  32.25 34.25 21.25 34.25 32.25 34.25 34.25 34.25 34.25 34.25 34.25 34.25	18.5 18.5 18.5 18.5 17.5	Blk. 32.75 34.75 21.75 34.75 32.75 34.75 34.75 34.75 34.75 34.75 34.75	19.5 6.5 19.5 17.5 19.5 19.5 19.5 19.5 19.5	Blk.  33.25 35.25 22.25 35.25 33.25 35.25 35.25 35.25 35.25 35.25 35.25 35.25	20.0 20.0 19.0	Blk. 34. 75 36. 75 23. 75 36. 75 36. 75 36. 75 36. 75 36. 75 36. 75 36. 75 36. 75	Gal. 18.0 20.0 7.0 20.0 18.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0	15.75	0.0	19.75	2.5	22.25 22.25 22.25 22.25	5.0	23.75	6.5
PLAIN ENDS Sparrows Pt. B3 Youngstown R3 Footana KI Footana KI Fittabureh J3 Alten, III. L1 Sharen M3 Pittabureh N1 Wheeling W5 Wheeling W5 Indiana Harber Y1 Lorain N2	16.75 29.75 27.75 29.75 29.75 29.75 29.75 29.75	15.0 13.0 15.0 15.0 15.0 15.0 15.0	31.75 33.75 20.75 33.75 31.75 33.75 33.75 33.75 33.75 33.75 33.75 33.75	19.0 17.0 19.0 19.0 19.0 19.0 19.0 19.0	33.75 35.75 22.75 35.75 35.75 35.75 35.75 35.75 35.75 35.75 35.75	22.5 20.5 22.5 22.5 22.5 22.5 22.5 22.5	34. 25 36. 25 23. 25 36. 25 34. 25 36. 25 36. 25 36. 25 36. 25 36. 25 36. 25	21.5 19.5 21.5 21.5 21.5 21.5 21.5 21.5 21.5	34.75 36.75 23.75 36.75 34.75 36.75 36.75 36.75 36.75 36.75 36.75	22.5 20.5 22.5 22.5 22.5 22.5 22.5 22.5	35. 25 37. 25 24. 25 37. 25 35. 25 37. 25 37. 25 37. 25 37. 25 37. 25 37. 25 37. 25	23.0 21.0 23.0 23.0 23.0 23.0 23.0 23.0 22.0	35.75 37.75 24.75 37.75 37.75 37.75 37.75 37.75 37.75 37.75 37.75	22.0 20.0 22.0 22.0 22.0 22.0 22.0 21.0	16.25 16.25	0.75 0.75	20.75	3.75 3.75 3.75	23.75 23.75 23.75 23.75	6.75 6.75	28.75	9.75

Galvanized discounts based on zinc, at 11¢ per lb, East St. Leuis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1½ in., ½ in., ½ pt. 2½ in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢. East St. Louis zinc price now 9.25¢.

Bast St. Louis zinc price now 9.25¢.

# CLAD STEEL

Stainless-carbon	Plate	Sheet
No. 304, 20 pct. Coatesville, Pa., L4	*32.7	
Washington, Pa., J2		
Claymont, Del., C4		
New Castle, Ind., 12	****	32.50
Nickel-carbon		
10 pct. Coatesville, Pa., L4	37.5	
Inconel-carbon		
10 pct. Coatesville, Pa., L4	46.10	
Monel-carbon		
10 pct. Coatesville, Pa., L4	38.90	
Aluminized steel sheets, hot dip, Butler	20170	
Pa., A7		

CAST IRON WATER PIPE

# **ELECTRICAL SHEETS**

22 Ga. H-R cut length F.o.b. Mill Cents Per Lb.	Armature	Elec.	Motor	Бупато	Transf. 72	Transf. 65	Transf. 56
Beech Bottom WS		8.75	9.75	10.65	11.60	12.15	12.65
Brackenridge A5.		8.75	9.75	10.65	11.60		12.65
Granite City G2	8.60	9.20	10.28				
Ind. Harbor 13	8.15	8.75	9.75				
Manfield E2	8.15	8.75	9.75	10.65			
Newport, Ky. N5	8.15	8.75	9.75	10.65	11.60		
Niles, O. N3	8.15	8.75	9.75				
Niles, O. N3 Vandergrift U1	8.15	8.75	9.75	10.65	11.60	12.15	12.65
Warren, O. R3	8, 15	8.75	9.75				
Warren, O. R3 Zanesville A7	8.15	8.75	9.75	10.65	11.60	12.15	12.65

# TOOL STEEL

***	O	37	Мо	G-	Base
VV	Cr	V	MO	Co	per lb
18	4	1	-	dimension	\$1.48
18	4	1	_	5	2.16
18	4	2	-	-	1.64
1.5	4	1.5	8	_	.895
6	4	2	6	-	1.005
High-	carbon	chrom	ium .	 	70
Oil ha	rdened	mange	nese	 	39
Specia	al carbo	n		 	355
Extra	carbon	1		 	30
Regul	ar carb	on			25
	rehouse				

to 24-in., of to 24-in., of to 24-in., I do in. and la Francisco rail shipment Class "A dipe is \$5 s	lel'd I Birmin Irger o, Los nents s less " and	N. Y. nghan f.o.b. Ange ; rail	cars, les, fo and w \$1 pipe,	15.00 t 98.00 t San or all vater 29.50 t	to \$11 to 11 to 16	5.30 6.00 2.50	H O S <sub>I</sub> E R	igh-ca il hard pecial xtra d egular Ware	dened carbon carbon carb house are	man	mium ganese es on per lb.	and c	ast of	1.64 .895 1.005 .70 .39 .355 .30 .25 Mis-
WAR										Bast	price, f.	o.b., dal	lars per 1	00 lb.
HOUS	ES		Sheets		Str	rip	Plates	Shapes	Ba	PB.		Alloy	Bars	
Silies S	Delivery	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Structural	Hot-Rolled	Cold- Finished	Hot-Rolled A 4615 As rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4615 As rolled	Celd-Drawn A 4140 Annealed
Baltimore	\$.20	6.20	7.64	7.78	7.00		6.85	6.98	6.86	8.17				
Birmingham	15	6.15	7.00	8.004	6.30		6.35	6.35	6.15	8.75				
Boston	20	6.89	7.83	9.18	7.13	9.23-	7.13	7.86	6.87	8.35		12.05		14.50
Buffalo	20	6.20-	7.15-	8.85-	6.65-	9.352	6.65-	6.55-	6.35	7.70	******	11.95		14.25
Chicago	20	6.35	7.70	9.01 8.15	6.79		6.68	6.59	6.28	7.30		11.75		14.25
Cincinnati	15	6.51	7.19	8.10	6.72		6.38	6.93	6.58	7.66		12.17		14.87
Cleveland	20	6.18	7.12	7.90	6,58		6.50	6.79	6.34	7.40		11.89		14.39
Denver		7.95	8.85	10.47	8.20	9.55	7.95	7.95	8.85	9.05		16.05		15.75
Detroit	20	6.35-	7.29-	8.42	6.69-	7.36	6.80	6.91-	6.56	7.60	12.47	11.92	14.42	13.44
Houston	20	7.15	7.31	9.40	7.71 7.45		7.20	6.93 7.35	7.45	9.30		12.95		14.62
Kansas City	20	6.85	7.85	8.67	7.09		7.00	7.13	6.95	8.08		12.42		
Los Angeles	20	7.25	9.00	9.70	7.55	10.75-	7.05	7.35	7.15-	9.10-	13.20	13.05	15.75	15.85
Memphis	10	6.79	7.69		6.90	11.30	7.01	7.09	7.25 6.88	9.75				16.05
Milwaukee	20	6.35	7.12	8.00-	6.59-	8.07	6.58	6.61-	6.45	8.31 7.57		11.92		14.42
New Orleans.	15	6.51	7.41	8.32 9.32	6.68	10.42	6.55	6.63	6.60	8.42-				
New York	30	6.78	7.756.	8.42-	7.16	9.05	6.99	7.45 6.98	7.06	10.42 8.43	12.29	12.14	14.54	14.64
Nerfelk	20	6.90	8.20	8.673	7.20		7.15	7.20	7.20	8.50				
Philadelphia	25	6.60	7.38	8.15	7.82		6.63	6.67	6.87	8.24	12.04	11.89	14.29	14.39
Pittsburgh	20	5.95-	6.82		6.20	-	6.03			7.65		11.45		13.75
Portland	10	6.18 7.90	7.12 8.45	8.00 9.15	7.65		6.33	6.46 7.25	6.28 7.35	10.65		11.75		14.25
Salt Lake City	20	9.05	10.80	10.65	9.35	11.25	8.70		9.10-	11.25				
San Francisco	20	7.35	8.70	9.50-	7.60	10.35	7.29	7.25	9.20 7.15	9.75				15.55
Seattle	20	8.15	9.50	10.15	8.00		7.68		7.60	9.85		13.05		16.0
St. Louis		6.48	7.42	8.45	6.72	8.47	1		6.58	7.50				14.5
St. Paul		6.84	7.78	3.66	7.09		6.99	7.12	6.94	7.70		12.4		

Base Quantities (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity. Exceptions: (1)500 to 1499 lb. (2)20,000 lb or over. (2)450 to 1499 lb. (4)500 to 9999 lb. (5)1000 lb or over. (5)400 to 1499 lb.

# MERCHANT WIRE PRODUCTS

	Standard & Coated Nails	Weven Wire Fence 9-151/2 ga.	"T" Fence Pests	Single Loop Bale Ties	Twisted Barbless Wire	Galv. Barbed Wire	Wire /	Merch. Wire* Galv.
F.o.b. Mill	Col	Col	Col	Cel	Col	Cel	¢/lb.	¢/86.
Alabama City R3. Aliquippa, Pa. J3. Atlanta A8. Bartenville K2. Buffale W6. Chicago, Ill. N4. Cleveland A6. Cleveland A5. Crawfrdsvl. M4. Donora, Pa. A5. Duluth A5. Fairfield, Ala. T2. Galveston D4. Houston S2. Johnatn., Pa. B3. Joliet, Ill. A5. Kokomo, Ind. C9. Los Angeles B2. Kansas City S2. Minnequa C6. Moneasan P6. Moline, Ill. R3. Pittsburg, Cal. C7. Portamouth P7. Rankin, Pa. A5. So. Chicago R3. S. San Fran. C6. Sparrowa Pt. B5. Struthera, O. Y1. Worcester A5.	131 133 133 131 137 133 131 131 131 133 133	143 145 144 142 140 140 140 140 141 140 141 141 143 143 144 144 144 144 144 144	145 145 156 143	151 149 149 149 149 151 161 155 173	155	150 158 157 153 153 153 153 153 154 164 154 155 151 151 151 151 151 151 151 15	6.675 6.775 6.675 6.675 6.675 6.675 6.675 7.075 6.677 7.625 6.677 7.625 6.677 7.625 6.677 7.625 6.673 7.765	7. 20 7. 30 7. 275 7. 175 7. 175 7. 175 7. 175 7. 175 7. 175 17. 175 175 175 175 175 175 175 175 175 175
Williamsport, Pa. S10								

Cut Nails, carloads, base \$8.00 per keg (less 20¢ ts jobbers), at Conshohocken, Pa. (AZ). \*\* Alabama City and So. Chicage den't include zinc estra. Galvanized products computed with zinc at 11.0¢ per lb.

# C-R SPRING STEEL

		CARBO	N CON	ITENT	
Cents Per Lb. F.e.b. Mill	0.26- 0.40	0.41- 0.60	0.61-	0.81- 1.05	1.04-
Bridgeport, Conn. S7*	5.75	7.65	8.60	10.55	
Carnegie, Pa. S9		7.65	8.60	10.55	
Cleveland A5	5.45	7.65	8.60	10.55	
Detroit D1	5.65	7.85	8.45	10.55	
Detroit D2	5.65	7.85	8.80		
Harrison, N. J. CII			8.90	10.85	13.1
New Castle, Pa. B4		8.00	8.60		
New Haven, Conn. D/	5.90	7.95	8.55	10.65	
Riverdale, Ill. Al	5.70	.7.80	8.75	10.70	
Sharen, Pa. Sl	5.45	7.65	8,60	10.55	
Trenton R4		7.95	8.90	10.85	
Wallingford W1	6.20	7.95	8.90	10.85	
Warren, Ohio T4		7.65	8.60	10.55	
Weirton, W. Va. W3.		7.65	8.60	10.55	
Worcester, Mass. Al		7.95	8.90	10.85	
Youngstown C5		8.00	8.60	10.55	12.1

\* Sold on Pittsburgh base.

# BOILER TUBES

S per 100 ft. carload	Si	ize	Sean	nless	Elec.	Weld
lots, cut 10 to 24 ft. F.o.b. Mill	OD- ln.	B.W. Ga.	H.R.	C.D.	H.R.	CD
Babcock & Wilcox	2 2½ 3 3½ 4	13 12 12 11 10	27.34 36.82 42.52 49.63 65.91	44.41 51.28 50.87	35.70 41.23 48.13	49.73 58.84
National Tube	2 21/2 3 31/2 4	13 12 12 11 10	36.82 42.52 49.63 65.91	51.28	35,70 41.23 48,13	
Pittsburgh Steel	2 21/2 3 31/2 4	13 12 12 12 11	42.52	32.95 44.41 51.25 59.87 79.56		

<sup>\*</sup> Includes annealing and pickling, sandblasting.

# RAILS, TRACK SUPPLIES

S

Galle.

/lb.

.175

7.075 7.075 7.075 7.075

7.425 7.225 7.075 7.175

7.825 7.325 7.225

8.025

20é to

12.85 12.85 12.85

13.15

13.00 12.85 13.15 13.15 12.85 12.85 12.85 12.85 13.15 12.85

ec. Weld R. C.D.

51 31.98 70 43.07 23 49.73 13 58.06 92 77.10

AGE

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer UI. Chicage R3. Cleveland R3. Ensley T7. Fairfield T2. Gary UI. Ind. Harber I3. Johnstown B3. Joliet UI. Kansas City S2. Lackawanna B3. Minnequa C6. Pittaburgh OI. Pittaburgh P1.	4. 325 4. 325 4. 325 4. 325	5.20 5.20 5.20 5.20 5.20 5.20	5.275 5.275 5.275	7.05 7.05 7.30	10.50	5. 125 5. 125 5. 125 5. 125	11.00
Pittsburgh F3 Pittsburgh J3 Pitt'g, Cal. C7 Seattle B7 Steelton B3 Struthers Y1 Terrance C7 Youngstown R3.	A 325	****	5.275	7.55		5.275 5.275 5.125	11.50

# LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective July 1, 1953, to end of 1954 season.

												oss Ton
Openhearth	lump .			*						×		\$11.15
Old range, b	essemer						* 1					10.30
Old range, r	onbesse	m	er									10.15
Mesabi, bess	semer .											10.05
Mesabi, non	besseme	r										9.90
High phospl	norus .											9.90
Prices bas	ed on u	DD	er	I	48	k	es	3 1	ri	L	1	freight

rrices based on upper Lakes rail freight rates, Lake vessel freight rates, handling and unloading charges, and taxes thereon, in effect on June 24, 1953. Increases or decreases after such date are for buyer's account.

# COKE

Furnace, beehive (f.o.b.												
Connellsville, Pa		,	. !	8.	L	4.	2	ő	-1	to	1	14.50
Foundry, beehive (f.o.b.	. 1	01	V	er	1							
Connellsville, Pa			. !	\$	L	6.	5	0	1	to	1	17.00
Foundry, oven coke				*		-	-					
Buffalo, del'd											9	28 08
Chicago, f.o.b.			۰	۰	۰	٠		•	۰	۰	* 7	24.50
Detroit, f.o.b.			0			0	۰		*		0	25.50
New England del'd					0	0	0		0	0		26.05
New England, del'd			0	0		0	0		0	0		
Seaboard, N. J., f.o.b	6		0	0			0	0		7	0	24.00
Philadelphia, f.o.b.				0				0	0	0		23.95
Swedeland, Pa., f.o.b			0					0				23.85
Painesville, Ohio, f.o.	b.											24.00
Erie, Pa., f.o.b.								_				25.00
Cleveland, del'd				Ī								27.43
Cincinnati, del'd						Ĭ		•		۰	0	26.56
St. Paul, f.o.b.					•	•			٠			23.75
St. Louis, f.o.b.	0 0			0			0	0	0		0	
Rirmingham for	0 0		٠		0	0		9	0	0	0	26.00
Birmingham, f.o.b.	0 0		0		0	0	0	9	0	0	0	22.65
Lone Star, Tex., f.o.b.	0		0			0						18.50

# **ELECTRODES**

Cents per lb, f.o.b. plant threaded electrodes with nipples, unboxed

Diam, în în.	Length in in.	Cents Per Ib.
	GRAPHITE	
24 20 12. 14. 18 7 to 10 4 214 2	8 4 7 2 7 2 6 0 6 0 4 0 3 0 2 4	20.50 20.00 20.50 21.00 23.25 26.00 27.25 <b>28.00</b> 43.50
40 35 30 24 20 17 11 10 12	CARBON 100, 110 110 72 to 84 90 72 72 60 60	8.95 8.95 9.10 8.95 9.10 9.50 10.56

# BOLTS, NUTS, RIVETS, SCREWS

# Consumer Prices

(Base, discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

# Nuts, Hot Pressed, Cold Punched-Sq.

P	ct Off	List		
	Less ·	K.	Less Keg	K.
1/2 in. & smaller 9/16 in. & 5/4 in.	+2 +7	g. 15 11	Hv:	7. 18 +10•
9/16 in. & % in. % in. to 1½ in. inclusive	+8	10	+27**	+6**
1% in. & larger * 9/16 to % in ** % to 1% in	+9	9	+27	+6

# Nuts. Hot Pressed—Hexagon

½ in. & smaller 9/16 in. & 5% in.	11 2	26 18	+20	23 net
% in. to 1½ in. inclusive 1% in. & larger	+6 +8	12 10	+25 +25	$^{+4}_{+4}$

# Nuts, Cold Punched—Hexagon

½ in. & smaller 1 9/16 in. & % in.	1 26 9 24	+2	15
% in. to 1 % in.	1 16	+9	9
1% in. & larger+1	.6 3	+20	net

# Nuts, Semi-Finished—Hexagon

1/4 in. & smaller	23	36	14	28
9/16 in. & % in.	18	32	4	20
% in. to 1 1/2 in.		0.0	1.0	10
inclusive	0	23	+8	10
1% in. & larger		. 5	+20	net
	Lig	ht		
7/16 in. & small-				
er	33	43		
½ in. thru % in. ¾ in. to 1½ in.	26	37		
% in. to 11/2 in.	10	0.0		
inclusive	18	30		

# **Stove Bolts** Pct Off List

Rivets	Base per 100 lb
1/2 In. & larger	Pet Off List
7/16 in. and smaller	

# Cap and Set Screws

(In bulk) P	ct Off List
Hexagon head cap screws, coar	se or
fine thread, 1/4 in. thru 1/4 in	. x 6
in., SAE 1020, bright	
34 in. thru 1 in up to & including	6 in. 26
1/4 in. thru 1/8 in. x 6 in. & sh	orter
high C double heat treat	
% in. thru 1 in up to & including	6 in. 33
Milled studs	
Flat head cap screws, listed size	8 12
Fillister head cap, listed sizes .	
Set screws, sq head, cup point,	
diam. and smaller x 6 in. & sh	norter 37

Machine and Carriage Boits		
	Pet Off	List
	Case	C.
1/2 in. & smaller x 6 in. &		
shorter	4	20
9/16 in. & % in. x 6 in. &	-	0.4
shorter	5	21
% in. & larger x 6 in. & shorter		19
All diam. longer than 6 in	+4	13
Lag, all diam. x 6 in. &	de d	1.0
shorter	12	27
Lag, all diam. longer than	L W	20
6 in	8	23
Plow bolts	30	

# REFRACTORIES

Fire Clay Brick Carloads pe	r 1000
First quality, Ill., Ky., Md., Mo., Oh (except Salina, Pa., add \$5.00)	109.00
No. 1 Ohio Sec. quality, Pa., Md., Ky., Mo., Ill.	102.00
No. 2 Ohio	93.00
No. 2 Ohio Ground fire clay, net ton, bulk (except Salina, Pa. add \$1.50)	16.00
Silica Brick	
Mt. Union, Pa., Ensley, Ala	115.00
Childs, Hays, Pa	120.00
Chicago District	125.00 $131.00$
Western Utah	138.00
Super Duty	100.00
Hays, Pa., Athens, Tex., Wind-	
ham	132.00
Curtner, Calif	150.00
ern (except Hays, Pa.)	19.00
Silica cement, net ton, bulk, Hays,	
Pa. Silica cement, net ton, bulk, Chi-	21.00
Silica cement, net ton, bulk, Chi-	20.00
cago District, Ensley, Ala Silica cement, net ton, bulk, Utah	20.00
and Calif.	28.50
Chrome Brick Per	net ton
Standard chemically bonded Balt Standard chemically bonded, Curt-	\$86.00
ner, Calif	96.25
Burned, Balt	80.00

# Magnesite Brick

Standard Baltimore Chemically bonded,		

Grain Mag	gnesite	St. % -in.	grains
in bulk i	f.o.b. Baltimore ines removed f.o.b. Chewala		\$64.40
Luning in bulk in sacks	, Nev.		38.00 43.75

Dead	Burned	Dolomite		Per net ton	ı
F.o.b.,	bulk,	producing	points	in:	
Pa.,	W. Va	., Ohio		\$14.50	0

# 

# **FLUORSPAR**

			Rosiclaire,	
			CaF; content	
			4	
60% or	less .	 	3	8.00

# **METAL POWDERS**

Per pound, f.o.b. shipping point, lots, for minus 100 mesh.	in	ton
Swedish sponge iron, c.i.f.	4.1	0= 1
New York, ocean bags	11	.25¢
Canadian sponge iron, del's.	1	2.0¢
Domestic sponge iron, 98+%  Fe, carload lots	1	8.0¢
Electrolytic iron, annealed, 99.5+% Fe	4	4.0€
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	6	0.0¢
Hydrogen reduced iron minus 300 mesh, 98+% Fe. 63.0¢	to 8	0.0¢
Carbonyl iron, size 5 to 10		
mieron, 98%, 99.8+% Fe. 83.0¢	10 3	1.5€
Brass, 10 ton lots 29.50¢ t		
Copper, electrolytic	43	1.50€
Copper, reduced		.50€
Cadmium, 100-199 lb 95¢ plus met Chromium, electrolytic, 99%	al v	alue
min., and quality, del'd		3.60
Lead	21	.00¢
Manganese	5	7.0¢
Molybdenum, 99%	- 1	2.75
Nickel, unannealed	89	.50€
Nickel, annealed	96	.50¢
Nickel, spherical, unannealed		.50€
Silicon	43	3.50¢
Solder newder 7 04 to 0 04 plus me	4 22	o livo

Mich buchull, 3370	@ W
Nickel, unannealed	89.500
	96.50
Nickel, spherical, unannealed	93.50
Silicon	43.50
Solder powder 7.0¢ to 9.0¢ plus met	. value
Stainless steel, 302	
Stainless steel, 316	
Tin 14.04¢ plus meta	
Tungsten, 99% (65 mesh)	\$5.35
Zinc, 10 ton lots	0 25.0

# Ferroalloy Prices

(Effective Mar. 9, 1954)		
Ferrochrome  Contract prices, cents per lb contained Cr. lump size, bulk, in carloads, delivered.	Spiegeleisen Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa. Manganese Silicon	Alsifer, 20% Al, 40% Si, 40% Fe, contract basis f.o.b. Suspension Bridge, N. Y. Carloads
65-72 Cr. 2% max. St.	16 to 19% 3% max	Ton lots 11.30
0.06% C 34.50 0.50% C 33.25	19 to 21% 3% max 86.00 21 to 23% 3% max 88.50	f.o.b. Langeloth, Pa., per pound
0.025% C . 34.50	23 to 25% 3% max 91.00	contained Mo \$1.15
65-69% Cr. 4.9% C	Managana Matal	Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered
02-0070 C1, 1.0% C, 0-3% S1 20.00	Manganese Metal Contract basis, 2 in. x down, cents per	per pound contained Cb. Ton lots \$6.40
S. M. Ferrochrome	pound of metal, delivered.	Less ton lots 6.45
Contract price, cents per pound, chromium contained, lump size, delivered.	95.50% min. Mn, 0.2% max. C, 1% max. Si 2.5% max Fe.	Ferro-Tantalum-Columbium, 20% Ta, 40% Cb, 0.30% C. Contract
High carbon type: 60.65% Cr. 4-6%	Carload, packed	basis, delivered, ton lots, 2 in.
Si, 4-6% Mn, 4-6% C. Carloads		x D, per lb of contained Cb plus Ta
Ton lots	Electrolytic Manganese	Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound con-
27.00	F.o.b. Knoxville, Tenn., freight allowed	tained Mo \$1.32
High-Nitrogen Ferrochrome	Carloads 30.00	Ferrophosphorus, electric, 23- 26%, car lots, f.o.b. Sigle, Mt.
Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon fer-	Carloads 30.00 Ton lots 32.00 250 to 1999 lb 34.00	Pleasant, Tenn., \$4.00 unitage,
rochrome price schedule. Add 3¢ for each	Premium for hydrogen - removed	per gross ton
additional 0.25% of N.	metal 1,50	Dannettentum 400 roculos
Chromium Metal	Medium Carbon Francisco	grade, 0.10% C max., f.o.b. Ni- agra Falls, N. Y., and Bridge- ville, Pa., freight allowed, ton lots, per lb contained Ti \$1.35
Contract prices, per lb chromium con-	Medium Carbon Ferromanganese Mn 80% to 85%, C 1.25 to 1.50, Contract	lots, per lb contained Ti
tained, packed, delivered, ton lots, 97% min. Cr. 1% max. Fe.	Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn 21.35¢	Ferrotitanium, 25% low carbon.
0.10% max. C \$1.18 0.50% max. C 1.14	no or contained Mn 21.35¢	0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville,
0.50% max. C	Low-Carb Ferromanganese	Pa., freight allowed, ton lots, per lb contained Ti
	Contract price, cents per pound Mn con-	Less ton lots 1.55
Low Carbon Ferrochrome Silicon	tained, lump size, del'd Mn 85-90%. Carloads Ton Less	Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls.
(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara	0.07% max. C, 0.06%	N. Y., freight allowed, car-
Falls, freight allowed, lump 4-in, x down.	D 000 Wm 2000 91 95 22 05	Ferrotungsten, ¼ x down,
bulk 2-in. x down, 24.75¢ per lb of contained Cr plus 12.40¢ per lb of contained Si.	0.15% max. C	packed, per pound contained
Bulk 1-in. x down, 24.90¢ per lb con-	F. 30% Max. C 27.95 29.80 31.00 0.15% max. C 27.45 29.30 30.50 0.30% max. C 26.45 28.30 20.50 0.50% max. C 26.45 28.30 29.50 0.75% max. C 80.85%	W. ton lots, f.o.b \$3.89 Molybdic oxide, briquets or cans,
tained Cr plus 12.69¢ per lb contained Si.	0.75% max. C, 80-85% Mn, 5.0-7.0% Si 23.45 25.30 26.50	per lb contained Mo, f.o.b. Langeloth, Pa
Calcium-Silicon		bags, f.o.b. Washington, Pa.,
Contract price per lb of alloy, lump	Silicomanganese	Langeloth, Pa \$1.13
delivered. 30-33% Cr. 60-65% Si. 3.00 max. Fe.	Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn,	Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per
Carloads 19.00	18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.	Ohio, freight allowed, per pound
Ton lots	Carload bulk 11.40	Ton lots, bulk lump 14.50¢
	Ton lots	Less ton lots, lump 10.200
Contract prices cents per lb of allow	delivered, per lb of briquet 12.65 Ton lots, packed 14.25	Vanadium Pentoxide, 86-89% V <sub>3</sub> O <sub>5</sub> contract basis, per pound
Contract prices, cents per lb of alloy lump, delivered.		Contained V <sub>2</sub> O <sub>5</sub> \$1.25
16-20% Ca. 14-18% Mn. 53-59% St.	Si 14.01 to 14.50 pct. f.o.b. Keokuk.	zirconium, 35-40%, contract basis, f.o.b. plant, freight al-
Carloads       20,00         Ton lots       22,30         Less ton lots       22,30	Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$92.00 gross	lowed, per pound of alloy. Ton lots
Less ton lots 23.30	ton, freight allowed to normal trade area.	Zirconium, 12-15%, contract ba-
SMZ	Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$89.50. Add \$1.00 per ton for each additional 0.50% Sl up to and including	sis, lump, delivered, per 10 of alloy.
	additional 0.50% SI up to and including 17%. Add \$1.45 for each 0.50% Mn over	Carload, bulk 8,000
Contract price. cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.	1%.	Boron Agents Borosil, contract prices per lb of
Ton lots	Silicon Metal	Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohlo, freight allowed, B, 3-4%, Si,
Less ton lots	Contract price, cents per pound con-	40-45%, per 10 contained B
V Foundry Alloy	tained Si, lump size, delivered, packed.	Bortam, f.o.b. Niagara Falls
Cents per pound of alloy, f.o.b. Suspen-	96% SI, 2% Fe 20.10 18.00 97% SI, 1% Fe 20.60 18.50	Less ton lots, per pound 50¢
sion Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn.	0170 101, 170 10 11111 20100 10100	Corbortam, Ti 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4-5-7.5% f.o.b. Suspension Bridge, N. Y.,
8-11% Mn. Ton lots	Silicon Briquets	
Less ton lots	Contract price, cents per pound of briquet bulk, delivered, 40% Si, 2 lb Si	Ton lots per pound 10.000
Graphidox No. 4	briquets. Carloads, bulk	Ferroboron. 17.50% min. B, 1.50%
Cents per pound of allow fob Sue	Ton lots 8.55	max. S1, 0.50% max. A1, 0.50% max. C, 1 in. x D, Ton lots \$1.20 F.o.b. Wash., Pa.; 100 lb up
pension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%,	Electric Ferrosilicon	10 to 14% D
Ca 5 to 7%.	Contract price, cents per lb contained	14 to 10% B
Carload packed	Si. lump, bulk, carloads, delivered.	Grainal, f.o.b. Bridgeville, Pa.,
Less ton lots 20.00	25% Si 20.00	freight allowed, 100 lb and over
Ferromanganese	65% Si 13.60 90.95% Si 17.00	No. 6 No. 79
	Calcium Metal	Managara - Baron 75 00% Mn.
Maximum contract base price, f.o.b., lump size, base content 74 to 75 pct Mn; Cents	Eastern zone contract prices, cents per	max. Si. 3.00% max. C. 2 in. x
Producing Point Cents	pound of metal, delivered.  Cast Turnings Distilled	max. Si, 3.00% max. C, 2 in. x D, del'd. \$1.46
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland	Cast Turnings Distilled Ton lots \$2.05 \$2.95 \$3.75 Less ton lots . 2.40 3.30 4.55	Less ton lots
Ore. 10.00 Clairton, Pa. 10.00		1 100 D 1000
Sheridan, Pa	Ferrovanadium	Max. Al, 1.50% max. Si, 0.50% Max C, 3.00% max. Fe, balance Ni, delivered \$2.05
Add or subtract 0.1¢ for each 1 pct Mn above or below base content.	35-55% contract, basis, delivered, per pound, contained V.	Ni, delivered Less ton lots \$2.05
Briquets, delivered, 66 pct Mn: Carloads, bulk	Openhearth	Less ton lots deligared
Ton lots, packed	High speed steel (Primos) 3.20-3.25	Ton lots 45.006



4.75

\$1.32

\$1.35

77.00

\$3.80

\$1.14

\$1.13

\$1.25

21.000

8.00¢

\$5.25

10.000

\$1.20

\$1.00 68¢ 50¢

\$2.05

45.000

AGE

BRAZING RINGS

... that Save Money 3 Ways

Look What Alloy's Special Packaging Methods Can Do for You.

1 ELIMINATE REJECT LOSS... Every Alloy Ring you buy is a usable ring. Precision formed and cut, each ring is separate, accurate and uniform. Alloy rings are packaged on paper tubes or wood dowel rods for protection in handling. Deformed and tangled rings are completely eliminated.

2 SPEED PRODUCTION . . . Alloy packaging protects each ring . . . makes application easier and faster. You save time and money because operators in your plant can remove the rings singly or as needed on your assembly line without loss of time or interruption due to bent or tangled rings.

CONTROL INVENTORY CONSTANTLY
. . . Alloy's packaging method provides a simple, rapid inventory control. Each tube and carton has a determined number of rings. Each job can be charged with a specific quantity of rings. Excessive losses can be detected readily. Inventory check-ups can be quickly and accurately made.

Get maximum benefit of production brazing by having best quality work at the lowest cost... One trial order will convince you.

Write for full information on Brazing rings, preformed shapes, silver alloy, copper, soft solder and flux.



ALLOY RING SERVICE, INC. . 1095 EAST 52nd STREET - INDIANAPOLIS 5, INDIANA

Are you a Foundry Ostrich?

This stubborn bird hides his head in green sand every time someone mentions impregnation sealing of porous\* castings. Doesn't believe in it!

He just won't look the facts in the face—even when those facts are that for hundreds of companies modern impregnation methods and materials have substantially licked the problem of porosity in pressure castings!

Many of these companies carry famous names—wouldn't endanger quality or reputations for all the gold at Fort Knox. So what's happened? Using the new impregnation methods and materials we've been able to develop at Tincher, they've cut rejects of castings to the lowest level in their history! And they haven't lowered quality by a hair's breadth!

This kind of experience points up one thing: Impregnation has "come of age"-quite largely because of Tincher research and development. For instance, right now we have new but thoroughly field-proven formulas for Tincher IMPREX Metallic Sealants that insure deep penetration and positive sealing. We also have a new IMPREX Plastic Sealant that permanently cures very coarse porosity-even "squirters". We'd like you to make us prove that we can eliminate porous castings as a problem in your plant. Send us a sample batch of castings that you have found to be porous. We'll pay the shipping costs both waysimpregnate them and return them to you. You test 'em, under your own conditions—see for yourself whether we can do what we say.

NO OLIGATION WHATSOEVER -but do it now! Send coupon for

shipping instructions.

\*Castings that must withstand liquid or air pressures and which have been rejected after tests as "leakers".

IMPREX PROCESS

SEALS FOR HIGHER QUALITY, MORE PROFITABLE PRODUCTION

	Please send shipping instructions for my sample batch
	of castings consisting ofpieces. They weight about each and are (give approximensions) in size.
Name	
Title_	
Comp	any
Street	
City_	Zone State

# RE-NU-BILT GUARANTEED ELECTRIC POWER EQUIPMENT

		D. C.	MOTORS		
Qu.	H.P.	Make	Тура	Velta	RPM
1	2200	G.E.	MCF	600	409/509
1	2000	Whee.	Mill	800	230/460
1	1200	G.E.	MCF	680	750/950
1	940 960	Whee.	QM	250	140/170
1	900	Whae.		250	450/550
1	825	Whee,		250	95/190
1	600	AL Ch.		250	400/800
1	500	Whee.	CC-216	800	300/900
1	500	G.E.	MCF	600	300/900
2	450	Whee,		550	415
1	400	G.E.	MCP	550	300/1050
1	300	Whee.	CB-5094	250	575/1150
1	200/300	G.M.	MPC	230	360/920
1	250	G.E.	MPC	230	400/600
1	200	Bel.	ISTOT	230	720
1	200	Whse.	CB-5118	25-9	400/800
1	150	G.E.		800	150/750
1	150	Cr. Wh.	85H	259	1150
8	150	Cr. Wh.	83H-TEFC	236	880
1	150	Whee.	8K-151B	250	900/1800
1	150	Whee.	BK-201	220	360/950
1	50/120	G.E.	MCF	220	250/1000
2	100	Whee.	BK-181	220	450/1000
1	188	CI E	CDP-118	224	1780

# A. C. MOTORS

3 phase-60 cycle

		SLI	IP RING		
	1500 1500 1500 1000 1000 1000 500 500 50	Mello G. E. G. E. G. E. G. E. G. E. Whee G. E. Whee Whee G. E. G. E. Seed) Whee G. E. G. E	IP RING Type MT-498 MT-498 MT-498 MT-452 M-574Y CW 1M CW-900A CW-1218 MT-442Y 1M-17A MT-434-Y MT-506Y 1M-18 MT-566Y MT-566Y MT-5568Y 1M-18 MT-5568Y 1M-18	440 2300/4000 440/2200 2200 550 440 848 440 2300 440 440 440 440 440 440 440 440 440	8 peed 360 720 275 240 821 178 520 1178 520 720 525 720 525 720 625 825 825 825 825 825 825 825 825 825 8
1 1	200 150 150 150/75	G.E. Whee. Whee. G.E.	KT-557 CB-8568 CB IK	440 440 440 440 1	380 1800 880 580 00/450
2	125	Al. Ch.	HRONOU	2200	1750
1	4850	C.W.	3501-SL	13800/6900	514
2 2 2 2	3500 2100 1750 2006	G.E. G.E. Whee	TS ATI ATI	2300 2300 2300 2300	257 360 3600 128
8 1 1 1 1 1 1 1	735 720 500 500 450 450	G.E. G.E. Ideal Whse. Whse.	ATI T8 BM	3200/12040 2300/4600 2300/4160 440 2200 2200	800 720 1800 900 128.5 450
1	400	G.E.	_3 Ph.	2200 60 C	400
	1912	o seis-			A.C.
		***		U.U. 1	M. V.

MIII.	R.W.	Make	RPM	Volts	Velts
3	2000/2400	O.E.	150	250/200	2300/4600
3	1750/2100	G.E.	514	250/300	2200/4600
1	2000	G.E.		E 060	11000
2	2000	G.E.	514	600	6600/13200
3	1500	G.E.	720	600	6600/13200
1	1500	C.W.	514 8	0/115	4000/13000
2	1000	Whee.	900	608	4160
1	1000	G.E.	900	260	6600
1	1000(3U)	G.E.	P00	250	2200
1	750	Whse.	900	275	4166
2	750	C.W.	514 8	0/115	2396
1	600	G.E.	720	250	440/2300
		TRANS	SFORME	R5	
QII.	KVA	Make	Тура	Pà.	Voltages
1	5000	Whee.	OISC	3	3300x26466
1	2500	Whse.	DISC	8 2840	00/18200x460
3	2000	G.E.	HVDDJ		65090x13800
1	1500	G.E.	HT	8	13200x2300
3	1000	GE.	HYDDJ	1	2400x430
	1000	Wagner	OISC	4	13200x400

	FRI	EQUENCY	CHANG	ER SETS
Qu.	KW	Make	Free.	Valtages
1	12500	Whee.	25/60	13300/13200
1	3000	G.E.	25/60	2300/2200/4000
8	2500	G.B.	35/62.5	2300/2300
1	1000	G.B.	25/58.3	4400/2300
1	588	Al. Ch.	2580	11000/2200

# BELYEA COMPANY, INC.

47 Howell Street, Jersey City 6, N. J.

# The Clearing House

NEWS OF USED AND REBUILT MACHINERY

Cleveland Success Story . . . Not all the machinery rebuilders who set up shop during the Korean fighting have taken to the hills. Many who concentrated on 24-hour service and guaranteed workmanship are still very much in the running.

Lincoln Rebuilders Inc. on Cleveland's west side is a typical case. A little over 2 years ago Fred Mingo bought some used machinery, rebuilt it and set up a production line for a Cleveland firm. "Right then and there I decided to go into business myself," he told THE IRON AGE.

Things weren't easy at Lincoln Rebuilders during those first few months. Although there was a tremendous demand for rebuilt machinery the Lincoln name was new and din't ring a bell in the trade. Mr. Mingo admits he used up plenty of shoe leather to bring in enough business to meet his four-man payroll.

1953 A Banner Year . . . Success of his efforts is pretty well mirrored by Lincoln's 1953 record. A 14-man crew last year rebuilt over 100 machines ranging from woodworking tools to heavy Bullards. Dollar value of this volume was estimated at \$500,000.

The success story at Lincoln has generally moved along with a sustained demand for rebuilt machinery in the Cleveland area. Despite slowness in movement of used machinery, many rebuilders are going full blast. More than ten new firms have gone into business in the past 12 months. Some are working at least 50 hours per week.

Is Prosperity Permanent? . . . Minor boom, according to many rebuilders, has been kept afloat by: (1) attractive prices on rebuilds, (2) high price of late models, (3) rebuilding orders stemming from government's preventive maintenance and stand-by program.

Will prosperity last for rebuild firms such as Lincoln? At the present time the company has a sizable backlog in civilian and defense business. First quarter volume so far this year equals volume recorded during entire first half of '53. Lincoln Rebuilders' staff now includes 22 men.

Tool Exports Slump . . . Since the end of Korean hostilities, firms in both the new and used machine tool business which had hoped to re-enter foreign markets have been disappointed.

In a recent speech before a conference of the Metalworking Equipment Industry, Ralph J. Kraut, president of Giddings and Lewis Machine Tool Co., pointed out that during the years 1946 to 1950 the machine tool industry exported an average of 28 pct of its total output.

In 1953, at the close of the Korean conflict, foreign orders for machine tools fell to 7.5 pct of total production, making a drop of 20.5 pct from the industry's export quota of the total pre-Korea output.

European Competition Recovers . . . Main reason for the loss of overseas business is the rapid comeback made by European toolmakers at exactly the time when U: S. defense needs prevented competition. A continuing factor is the low European wage scale; three or four times lower than the U. S. rate. This wage differential. plus liberal subsidies granted to foreign toolmakers by their governments, makes it possible for a European producer to sell a machine tool for 50 to 100 pct below its U. S. counterpart.

Favorable prices plus pressure of defense needs have boosted sales of foreign tools in the U.S. from \$1.8 million in 1948 to an estimated \$50 million in 1953. This figure represents nearly 6 pct of last year's total sales of new machine tools in the U.S.